The Builder.

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The Craze of Mysticism.

SOME few years ago we reviewed, not without sympathy and interest, Mr. Lethaby's curious and suggestive volume on "Architecture, Mysticism and Myth." We concurred with him in the general belief that in the most ancient times of which any of the architectural monuments remain to us, there was an idea in the minds of their builders of planning and fashioning them — temples especially, which in ancient times were almost the only buildings of architectural importance—in accordance with some agreement with cosmical measurement and proportion as far as they knew it, or in accordance with a system of symbolism based on their notion of the order of the universe, or on a system of geometrical proportion which was regarded as symbolic. Mr. Lethaby, fortunately for himself and his book, did not attempt to go much into detail; he said he had not the necessary learning. He and his book were probably better without it; by keeping to generalities and to the poetic side of his subject he escaped pitfalls, and succeeded in suggesting many ideas in regard to abstract architecture which were exceedingly interesting, and were calculated to stimulate the architectural fancy and quicken the architectural imagination, even if they could not be turned to much practical use in every-day practice.

In the present day, when there is so much questioning and theorising as to what architecture might be or ought to be, it is not surprising that some persons should be tempted to take refuge in the contemplation of an imaginary perfection of architecture in accordance with some theory or rule which was once known and is now forgotten. And when people once begin to give themselves up to working out possible theories of this kind, it is not long before they are tempted to ride them to death; to see everything from the point of view they have adopted. Even a scientific man like Sir Norman Lockyer has not been proof against the snare. He took up the idea that the Egyptian temples were orientated towards particular stars or towards the sunrise on a certain day of the year, and allowed himself to be carried so far as to regard them as little more than so many telescopes or astronomical instruments, forgetting that all the architectural detail, the modelling, placing, and decorating of the columns, was entirely beside such a purpose, and must have had its own purely artistic end. And when persons of less scientific intellect begin to regard architecture entirely from the symbolic point of view, and to endeavour to reason out the bases of the symbolism in the architecture of the past ages, they are liable quickly to come to a pass which reminds one of Lear's exclamation — "Oh! that way madness lies." Such a readable and comparatively reasonable book as Mr. Lethaby's, above referred to, was not unlikely to be followed by others of a less sane description, such as the one which has recently been put forth, by an author who (wisely) remains anonymous, under the title "The Canon."* The title, which seems rather a puzzle at first sight, is intended to convey that there is existing a general rule by which all works of art, and architecture more especially, can be alone perfectly carried out. The result is the most extraordinary medley of absurdities that we have come across for a long time; but it serves as a warning of what writers are led into when they once give themselves up to this kind of mysticism.

The book is prefaced by an introduction by Mr. Cunninghame Graham, who is kind enough to inform us that "Music and literature, with painting, surgery, and economics, with boxing, fencing, and others of the liberal arts (!), all have a style fit and peculiar to the times, but architecture yet remains a blot and disgrace to those who live by it, and to all those who use the edifices which it makes, or pay the makers' bills." What are the pretensions of Mr. Cunninghame Graham to sit in judgment on all modern architecture we have yet to learn. The superiority of ancient architecture is proved, to Mr. Graham's satisfaction, by a quotation from a book by Antonio Llobera, printed at Figueras by Ignacio Porter in 1758, under the title "El Porqué de Todas las Ceremonias," which informs us that "all temples and churches are symbols or figures of the human body. . . . the high altar is the head, the transepts are the arms, and the rest of the temple . . . is the body," "so that he knew apparently that churches were built according to a canon, and had assumed the form in which we know them for a special reason." It is quite possible, and perhaps probable, that in the mediæval period such fancies were attached to the form of the ground plan of the church, and that the obliquity of the choir or eastern arm, in a good many churches, was a symbolism of the inclination of the head of Christ on the Cross; though even this is open to question, and some have been more inclined to explain it as an effort after a certain effect of perspective. But it is quite certain that the first Christian churches were not planned with that idea, because their plans will not work into it, and that the Latin cross form did not really develop from such an idea; it was symbolism tacked on afterwards, if it was there at all; and no man with a logical mind, who had studied conscientiously the development of church planning from the early Christian to the mediæval period, could imagine otherwise. And supposing that the mediæval church were planned with that symbolic idea, what the better is the architecture for that—what has that to do with art, except for the minds of children? Mr. Graham goes on to assure us that "the author of the present work argues out his case with much precision and a wealth of figures, proving most clearly that the external measurements of almost every ancient temple, the figures of the New Jerusalem, Holy Oblation" (what is the "Holy Oblation"?) "and other temples, real or imaginary, reveal the magnitudes of the sun moon, and other planets, together with distance of their orbits." As these were not correctly known until modern times, and as the earth was then supposed to be the centre of the cosmic system, the indications must in that case have been all wrong in relation to cosmical measurement; and if the beauty of architecture consists in its true relation to cosmical geometry, it is evident that in that case the ancient architecture was no better than the modern, which neglects cosmical geometry. But supposing it different—supposing that the builders of Greek or Egyptian temples knew

* "The Canon: an Exposition of the Pagan Mystery Perpetuated in the Cabala, as the Rule of all the Arts. London; Elkin Mathews; 1897.

as much about the measurements and distances of the heavenly bodies, and the measurement of the earth, as we know, what has that to do with the artistic effect and expression of a building? Geometric proportion in the parts of the building itself may have something to do with it, no doubt; but a building might represent correctly, in its various parts, certain proportions of cosmical scale—the relative orbits of the planets or their relative distance from the sun for instance; but what the better architecture is it for that? Or what the better are the details? Will cosmical geometry design a Corinthian capital?

As to the treatise which follows, such a medley of absurdity and childishness, to the extent of nearly four hundred pages, has certainly rarely been given to the world in modern days. It is as if all the foolish beliefs and fancies—"oppositions of science falsely so called"—which satisfied men in former days, were shovelled together and offered to us in a heap, as a solution of every artistic question. There is no order or logic in the composition; in many pages it is impossible to find out what the author is driving at. He tells us in the commencement of his introduction that "the failure of all efforts in modern times to discover what constituted the ancient canon of the arts, has made this question one of the most hopeless puzzles which antiquity presents." We may suggest the possibility that after all there was no such "canon," but we fear the author would regard that as rank blasphemy. Whatever be the puzzle, he has not succeeded in unravelling it. As far as he has any system at all it appears to consist in this: "the Greek and Hebrew letters had each a numerical value, so that every word in these languages may be resolved into a number by adding together the value of each letter of which it is composed." Accordingly we are to regard all ancient names as concocted to represent certain numbers, which numbers signify certain cosmical measures; the word χριστος is equivalent to 1,480, which "as will be shown further on, accurately exhibits an important measure of the cosmos." What this has to do with architecture or design is not apparent at first, and in fact it is only here and there that we get any indication of it. *Ex gr.*:—

"According to Vitruvius a man's height is four cubits=6 ft.=24 palms=96 digits. Now taking the earth's distance from the sun at 10, the radius of the sphere of the zodiac becomes about 96, so that the number of digits in a man's height may have been supposed to measure the seven orbits of the planets, surrounded by the fixed stars. In that case, when Vitruvius lays it down that all temples are to to be designed according to the proportions of the human body, he may mean that the temples were to conform to the measures of the universe."

"May mean" is delightful. There are better things than that in the book, and it is only justice to the author to say that he is less hesitating in many of his statements. Vitruvius, we may observe, is assumed to be an essentially mystical writer, with meanings which do not appear on the surface. The names and proportions connected with the Orders, we are told, "have evidently been assigned with a mystical purpose, as an analysis of their numbers will show. The Doric was the oldest column, and was first made in the proportion of six to one, in imitation of the body of a man, as it is said, whose foot was found to be the sixth part of his height." The author unfortunately seems rather out about the proportions of the Doric column; the Parthenon column is five and a half diameters; older examples, such as the large temple at Pæstum, are four and a half diameters. The Doric column, it appears, represented the Macrocosm; a little further on we are told that, being six to one (the author is determined to stick to that), it was the ratio of Noah's ark. Also the Greek words Κίων Δωρικός (Doric column) are equivalent to the number 2,084, "the side of the Holy Oblation." But there is yet more to be got out of the Doric column.

"The name Δῶρος yields 1,174, and this is the length of a rhombus whose width is 677, which is one more than the square of twenty-six, and one less than the length of the sun's orbit."

The sun's orbit is, we believe, stated in multiples of the earth's distance—when that happens to fit in with the figures wanted. The author has not been able, however, quite to hit it off here, as he has to be content with "one more" and "one less"; but that does not trouble him; he is quite sure of his conclusion from these figures, as follows:—

"The Doric column, therefore, may be said to be the symbol of the generative power of the universe, expressed by the sun, which of all the celestial bodies most conspicuously appears to measure the whole extent of the cosmic system."

And this is to lead us to the canons of art! There is plenty more in the book as amusing as this; but probably the reader has had enough. The book could hardly have been thought worth serious notice at all, but for the fact that it is almost too good a joke to be lost, and that it really does afford a useful kind of warning as to the sort of rubbish people may expect if they once lend an ear to architectural mystics.

THE NERNST ELECTRIC CANDLE.

ABOUT a year ago Dr. Walter Nernst, Professor of Physics in Göttingen University, and well known as the joint editor of the *Zeitschrift für Elektrochemie*, patented an electrolytic glow lamp which has excited a great deal of interest in electrical circles. He uses a strip of refractory material which, when heated by an electrical current, glows in the open air and produces a steady white light most suitable for illuminating purposes. His early experiments showed that its efficiency was much higher than that of the vacuum bulb glow lamp, the current required being only about a third of that taken by an ordinary lamp of the same candle power. Many subsequent experiments have verified Dr. Nernst's results, and the only point about which there is room for doubt is as to how long the wick will last before it needs replacing. To some it may seem a retrograde step to go back to an electric candle, and older electricians will remember that Jablochkoff candles required constant trimming, and that the carbons were rapidly consumed. The life of the strip of refractory material Dr. Nernst uses is, however, not to be measured by minutes, but by hundreds of hours, and it now seems probable that, in length of life, it may rival the incandescent lamp.

In the ordinary glow-lamp we have a carbon filament placed in an almost perfect vacuum, enclosed by a glass bulb. In the Nernst lamp there is simply a filament of badly-conducting material, like magnesia, stretched between the two terminals. In the earliest and simplest form of the lamp, when the current was switched on, very little passed, owing to the high resistance of the strip of magnesia at ordinary temperatures. If it were now heated by means of a match, or even by touching the strip with the glowing end of a cigarette, then its resistance fell, and the heating effect of the larger current was sufficient by itself to keep it incandesced. Measurements of the current taken showed that it was only between a third and a quarter of that taken by a vacuum bulb lamp of equal candle power.

The great drawback to the earlier lamps was the necessity of using a match in order to light them, but in several of the later modifications of his lamp Dr. Nernst gets over this difficulty in various ingenious ways. In one lamp he wraps round the strip of refractory material a fine platinum wire enclosed in a transparent insulating material. On closing the switch the electric current passes through this wire, heating it and thus causing the filament to light; and then a further motion of the switch cuts the platinum wire out of the circuit. In another lamp a small concave reflector is used to focus the heat from a small resistance coil on to the filament and so cause it to light; but in this lamp also the current has to be switched off the resistance coil by hand. In his latest form this is done automatically. When the lamp lights the current that then flows magnetises a solenoid which sucks up an iron bar and by this means breaks the circuit of the auxiliary heating coil.

It will be seen that the principle of Dr. Nernst's invention is simply to use as filaments for his lamps strips of those badly-conducting materials which become good conductors at high temperatures, such as magnesia, zirconia, lime, and the oxides of several metals. A good illustration of how this class of substances behave electrically is shown by a piece of glass rod. If we place this rod between the terminals of a Wimshurst machine, and then turn the handle, sparks will take place in exactly the same way as if there were no glass rod. On heating the rod with a Bunsen burner until it is red hot, then we can get no sparks at all from the machine, the electrical discharge passing quietly along the glass rod which is now a conductor. As the glass cools the discharge produces a beautiful glow in the rod very conspicuous in a darkened room, then occasional sparks ensue and finally the glass becomes a non-conductor again, at a temperature however considerably above the temperature of the room. Glass thus acts electrically in a totally different manner to metals, its resistance diminishing as its temperature increases. It acts in the same way as all bodies in which the passage of electricity is accompanied by chemical decomposition. These bodies are called in technical language electrolytes, and we can have solid electrolytes like glass as well as liquid electrolytes like the solutions that are used for electroplating or the liquids in a Daniell's cell.

Many electricians were of opinion that the Nernst Candle could only be used in alternating current circuits as the filament being electrolytic must be disintegrated sooner or later by direct current. Professor Nernst, however, in a recent letter to the *Electrotechnische Zeitschrift*, says that the latest form of filament he uses is equally applicable to either direct or alternating current.

In his English patent he claims to have invented a combination of a heating device with a material which is non-conducting when cold and conducting when at a high temperature, but he does not describe any method of preventing the disintegration of the electrolyte.

Professor Nernst and the *Allgemeine Elektricitäts Gesellschaft* are still making improvements on the lamp, and we are informed that it will be shortly placed on the market. As these lamps can be directly used in any installation (100—220 volts alternating or continuous), there is no need for altering or modifying the ordinary wiring of buildings, and consumers, therefore, need not be afraid that their present installations will soon become antiquated.

If it were possible to purchase Nernst lamps equal in efficiency to those we have seen, and if their life can be guaranteed for a few hundred hours, then there is no doubt that this method of lighting will become very popular. We fancy that there would be a fair demand even for the older forms of Nernst lamp, which require to be lighted by a match, as the meter bill would be reduced by their use to one-third its present amount. The cost of the materials used in making this lamp would be less than that of the materials used in an ordinary vacuum bulb lamp, and, apparently, they would be very easy to make. The replacing of the wick when worn out could be done as easily as changing a glow-lamp, and, unlike the glow-lamp, the only waste product would be the burnt out filament. In our opinion, if Dr. Nernst's invention survives the life test successfully, as we have reason to believe that it will, then it will prove a very formidable rival indeed to the glow-lamp.

NOTES.

Birmingham Water Famine.

THE water supply question in Birmingham has assumed a serious phase. If the city has to depend on the quantity of water now stored the supply can only last a few days longer. The Authorities have appealed to the public to curtail their consumption as much as possible, and the quantity saved by this and the water served to the largest reservoir by the river Bourne, now little more than a trickling ditch, may have the effect of prolonging the duration of the supply for a few weeks. It is recognised, however, that even if the immediate danger can be satisfactorily averted, an early winter with severe frost would bring about most serious consequences. The city is, of course, very anxious to get its new supply from Wales, when this state of things cannot possibly recur, but in the meantime something must be done to remedy matters. The immense reservoir at Shustoke is nearly 9 ft.. below its proper level, and that at Whitacre is absolutely empty. It is difficult to suggest any means of augmenting the supply at once; well-sinking, with all its uncertainties, is the first thing to present itself, but we fear there is little hope of much water for so large a city being obtained by that means in the neighbourhood. At the present moment 27 gallons per head per day are being served out, and that is above the average of last year's summer supply. The only thing to be done, apparently, is to reduce the quantity supplied, and wait for the rain.

The Strike in Paris.

AT Paris there is a strike among the excavators, well-sinkers, and tunnel excavators, the "Démolisseurs" having also joined in through sympathy. At this season it does not so much affect the building trade as the engineering work in hand for the Metropolitan Railway and the Exhibition. The strikers demand a pay of 60 centimes per hour—the official Price-book price—instead of that of 45 centimes now paid; and the suppression of the *signature* by which each labourer binds himself to work for the same pay, under all conditions, be it simple work, work in water or in mud, or dangerous well-sinking or tunnelling. The contractors are endeavouring to compromise, but the strikers hold out. The tunnel-excavators demand also an allowance for lamp-oil, which now costs each man 25 centimes (2½d.) a day. If the strikers obtain their demands, it is expected that the whole of the building trades will probably come out on strike successively.

The Clock Face, St. Paul's.

THREE years ago, in our issue of October 5, 1895, we called attention to the bad effect of the glazed clock face in the southern tower of St. Paul's, which filled up the opening with a kind of blank eye, contrasting painfully with the shadow in the corresponding face of the northern tower; while the dial thus treated must have been useless for illumination at night, as the figures were placed on the circular architrave round the opening, so that the hands only, and not the whole even of the minute-hand, could have been seen against the illuminated dial. The objections to the dial as thus treated seem to have been at last realised, as we learn that the dial is being removed and skeleton iron centres put in; the work being done by Messrs. Smith & Son of Derby, the makers of the clock. It appears that the illuminating lights had never been fixed behind the dial after all, so that it only spoiled the look of the tower by day and was of no use at night. The change is no doubt due to the influence of Mr. Somers Clarke, the present Surveyor to the Dean and Chapter.

Croydon Water Supply.

THE public inquiry into the proposal of the Croydon Corporation to utilise water at Waddon having led to a refusal to sanction the scheme, the Corporation are at their wit's end to know what to do next. In the meantime, the inhabitants, who have been under a very short and inadequate supply for some months—long before any question of serious drought could be entertained—are crying out loudly. The streets are not watered, the dust is abominable, the dustbins are not emptied frequently enough, and the death-rate has been slightly augmented, though the general health of the borough is yet good. We are not surprised that the Waddon source has been refused; the danger of contamination was too great, and any one with a knowledge of the official manner in dealing with water-supply questions could foresee what would happen. Meantime, the Corporation must do something—there is plenty of water to the southward—and the present state of things cannot long continue.

Artesian Wells in Paris.

THE engineers of the Municipal Service of Paris have just completed the piercing of the artesian wells at Butte-aux-Cailles (XIIIth arrondissement), commenced in 1864 by MM. Dru, and now terminated by M. Cerrault, who took charge of the work since 1872, and encountered unexpected difficulties which have delayed its completion till now. It is proposed to erect a large baths establishment at this point, and to lay out a square there. This is the fifth of the artesian wells sunk in Paris, all of which give a full flow of water.

Lincoln's Inn Fields Public Garden.

OUR readers will recall that the London County Council have lately testified to their desire to share, so far as may be, with those who seek to place on record the memories that attach to certain buildings and sites in London distinguished for their architectural, historical, and kindred interest. Their first step in that direction is somewhat unlucky. In the floor of the central pavilion in Lincoln's Inn Fields garden, of which the Council are now the custodians, has been inserted a small plate thus inscribed:—

On this spot was beheaded
LORD WILLIAM RUSSELL,
A lover of constitutional liberty,
21st July, A.D. 1683.

With the political events of the time we, of course, are not concerned, nor with the Council's opinions in that respect. But we may point out that they have fallen into a common error by describing William, Lord [Baron] Russell, as "Lord William Russell," a style he never bore. As the eldest surviving son of William, fifth Earl of Bedford, he had succeeded to the second title of his house: his father was advanced Marquis of Tavistock and Duke of Bedford, on May 11, 1694, eleven years after his son's death on the scaffold.

The Discobolos Statue.

UNEXPECTED light has been thrown on this statue, or rather series of statues, for there are several replicas of the same type in the British Museum, the Louvre, Vatican, and at Duncombe Park. The type in question is not the familiar one in which the actual moment of hurling the discus is represented, but the type, perhaps scarcely less familiar, in which the attitude is still erect, and the athlete advances with the right foot preparatory to the throw. The difficulty has always been felt—why is the athlete advancing the right foot, when the natural pose is with the left foot advanced? And as the Greek sculptor was no careless observer of the actualities of the gymnasium, the difficulty was a serious one. Dr. Trendelenberg, in the last issue of the *Jahrbuch* (xiii., 1898, heft 2, p. 127) solves the problem. The supposed athlete is no human athlete at all, but the god Hermes, patron of athletes, and he is not preparing to hurl the discus, but simply holding it in a characteristic attitude. This theory is placed almost beyond question by comparison of the statue with a coin of Amastris of Paphlagonia, where the god is represented exactly in the same pose as in the statue, and with a caduceus in the raised right hand. Dr. Trendelenberg proposes to restore the statue holding the caduceus.

Taunton Castle.

WE understand that the Somersetshire Archæological and Natural History Society propose to celebrate this, being their fiftieth, year by converting the great hall of the castle for purposes of their museum. The castle has formed the Society's headquarters

since its purchase by them in 1875. The castle was originally erected by Ina, who was King of Wessex in 688-728, and consisted for the most part of earthworks, whereof portions yet exist, together with some part of the structure built by Bishop Gifford (of Winchester) during Henry I.'s reign. Other additions were made in the fourteenth century, also by Bishop Langton in 1490, and by Bishop Horne ninety years later. Horne's great hall, repaired and altered in 1785, is the place wherein Judge Jeffreys held his "Bloody Assize," after the Duke of Monmouth's defeat at Sedgemoor. The castle and town had been held for a while by Perkin Warbeck, and in 1645 sustained, under Blake, a memorable siege against the Royalist troops commanded by Lord Goring until relieved by Fairfax. The Society's collections include six volumes of sketches, made in India ink, by J. and J. G. Buckler, father and son, of architectural remains in the county as they existed in the early years of the current century. Two views, by Mr. Roland W. Paul, of the castle courtyard and Langton's entrance gateway will be found in our number of August 20, 1892. Ethelheard, Ina's successor, gave Taunton to the bishops of Winchester.

A New Silver Exhibit, South Kensington.

THE collection of silversmiths' work lent by Colonel Waldo-Sibthorp to the South Kensington Museum, and which is to be found in a case on the left of the gangway in the second court of the Museum, contains some work of considerable artistic interest. The collection of English spoons includes a beautiful and unusual "Apostle" set, in which the figures are framed in little shrines at the top of the handles, each surmounted by a cock, and the junction of the spoon with the bowl is decorated by a cherubic head with crossed wings. Near these are a fine set of silver-gilt tea-spoons presented to Nelson, to which a marine character is imparted by the shell forms of the bowls and the dolphins twining up the handles. The plain or nearly plain English spoons of different dates are interesting from the degree of character imparted to them by the mere shape of the bowl and handle; in the majority of instances it is noticeable that, in opposition to the modern practice by which the bowl of a spoon is wide next the handle and rounds to nearly a point at the end, the bowl is narrow next the handle and spreads out to a wide rounded curve at the extremity. There is more of structural propriety of design in this than in the modern treatment; whether it is so convenient or so graceful for use may be questioned. A Scandinavian spoon in which the upper part of the handle is formed by a broad open trellis, and the handle is decorated by loose rings at the side, has a great deal of character. On the other side of the case a spoon marked "St. Andrew" shows how a good effect may be got by slightly modelling the surface of the bowl in radiating lines. Among the larger objects are some fine German cups and tankards, and one very bad one taking the shape of a spurred boot executed in silver, the leg forming the cup portion; about as tasteless a design as could be seen; but it may be useful as a warning. The cup and cover surmounted by the head of Gustavus Adolphus, which has attracted some attention, is not in reality a very good piece of work; it is feeble and pretentious in design. Among the curiosities of the collection are some salt-cellars accompanied or supported by little figures of men engaged in various occupations of which the bowl seems to form the object; and some small handbells in the shape of highly-dressed dames whose spreading skirts, chased with minute surface ornament, form the bell; two of these figures carry small bowls in their upraised arms which form the handle of the bell. For a small collection, there is a good deal that is interesting in this case of old silversmiths' work.

The Clairon Monument.

IN our issue of July 16 we gave an illustration of this fine piece of decorative monumental work, by M. Gauquié as sculptor and M. Guillaume as architect, and mentioned that it was to be erected at Condé-sur-Escaut, the birthplace of the celebrated actress. It appears, however, that the proud hamlet of Condé-sur-Escaut resents being connected with the memory of a mere actress, and has refused to permit the erection of the monument. Accordingly, it is to decorate some public place in Paris, not yet determined on. The rather stupid action of the Condé-sur-Escaut authorities (very unusual in France) will be a gain to Paris, as the monument is a really admirable work.

The Photographic Salon.

THE sixth exhibition of the Photographic Salon, now open at the Dudley Gallery, certainly shows a definite progress in the direction of making photography "expressive of personal artistic feeling and execution," which is the professed object of the Salon, though in some cases it is rather difficult to feel sure how far the result obtained can properly be defined as photography; some of the exhibits give the idea of being very much worked up by hand. There are landscapes, however, in which a very pictorial effect is obtained apparently by no means but focussing and choice of position and light; Mr. Hinton's "Suffolk Meadows" for instance (85), and Mr. Aston's "The Farmstead" (196). In other cases the photograph fails to answer to the title of the landscape; "Early Morning, Concarneau" (129), is no doubt a pretty miniature view, but where is the "early morning" effect? It might be any time of day. In "Sunshine and Showers" (201) Mr. H. P. Robinson has secured a fine effect of sky, but the sea looks rather hard. "An Atlantic Roller" (209), by Viscount Maitland, does not impress one as very real, nor does it show the scale of what, from the title, we presume was a pretty large wave. There are some portraits that are very effective and original-looking; such as Mr. F. W. Lee's "Ruth" (32), and Mr. Frederick Hollyer's portrait of Mr. Sauter (124). There are others, like Mr. Richard's "Darawa" (14) which have the appearance of red crayon sketches; are these produced by a photographic process properly so called? One may ask the same question as to the pretty delicate heads by Mr. Watts Lee (42 and 50), which have somewhat the appearance of small pencil sketches. The use of real figures with subject pictures still shows us how much we owe to the painter in the treatment of figures in art. Mr. R. W. Robinson's "The Deserted Nest" (121), for instance, children in a field, is Mrs. Allingham without the charm and poetry of the figures. Mr. Puyo's "Promenons nous dans les Bois" (16) is more successful than usual as a landscape and figure subject. Then we find in one picture a group of Phyllis and Prue (7) by Mr. Craig Amian, and then the same young women doing duty in another interior (134) as "The Burgomaster's Daughters." There are some pretty fancies in the exhibition, such as Miss Carine Cadby's "Roseleaves" (2), a brown silhouette of spray on a flat ground, and "Three Trees" (35), a small photograph of three nearly bare trees seen against the sky. On the whole, we think the Photographic Salon certainly increases in interest.

ECCLESIASTICAL AND EDUCATIONAL ART EXHIBITION AT BRADFORD.

IN connexion with the Church Congress, which is being held at Bradford this week, an Ecclesiastical and Educational Art Exhibition has been opened in a building specially erected for the purpose in Morley-street. The exhibition is divided into two sections—a loan collection and a trade or general division. The former contains a few examples of old work, amongst which may be mentioned two fine silver flagons, two cups, and an alms-dish from Kirkleatham Church, dated 1670, which were given to the church by Sir W. Turner, Lord Mayor of London; a silver dish supposed to have been washed up on the shore of Coatham from a Spanish ship—it was given to the Lord of the Manor, who presented it to Kirkleatham Church (it appears to be Spanish of the Plateresque period); a very beautiful silver gilt chalice and paten from the Church of St. Faith, Bacton, Herefordshire, of fifteenth-century workmanship — it has the name John Caputt or Capull stamped upon the base; the paten, too, is a very good one. There is another chalice, very similar in design, from Hinderwell, Yorkshire. It was found about fifty years ago built into the wall of a pig-stye; it has a crucifixion engraved upon the base. A paten was found with it. Also to be seen in the collection are a fine repoussée cup, with the London Hall mark 1662; an Italian cup in copper gilt, lent by the Leeds Clergy School; a large alms-dish in repoussée copper, from the Bradford Parish Church; and a repoussée paten from Putley Church, Ledbury, Herefordshire, bearing the inscription: "The Gift of Mr. Hen.(ry) Gwill^{m} (Guillim) de Brain to the Parrish of Putley, 1669.

Mr. S. Margerison exhibits a series of photographs, about 150 in number, entitled "What we see in an Old Church." The photographs, which are very good ones, are of old English churches, mostly in Yorkshire, and their screens, fonts, and other furniture.

After noting one or two pieces of old embroidery, we turn to the examples of modern work which are exhibited in the loan collection. Why they are here and not in the general collection with exhibits of a like kind is not very clear. The most prominent one, as it is exhibited in a case by itself, is a chalice for New York Cathedral, designed by Mr. W. Keith and made by Messrs. Keith & Co., of London. We are informed in the catalogue that "this chalice will vie in point of exquisite workmanship and richness of detail with any production of the old masters"; that "to adequately describe the great beauty of this chalice is almost impossible," and that "it is undoubtedly one of the finest specimens of modern ecclesiastical art workmanship that this country has seen." We are sorry that we cannot agree with the "expert" who gives the above description. The part of the chalice where it must be handled is a mass of small crockets, pinnacles, niches, cusps, and figures, all stuck on and so exceedingly sharp that it would be very uncomfortable to handle. Most of the other ornament on the cup itself, and on the base, consists of ribbons and strips of metal riveted on, and the whole finished in the hardest, sharpest, mechanical way. It is, no doubt, a very costly chalice, but it has very little artistic value. The same remarks apply to another chalice lent by the Rev. J. Edward Vaux, which is ornamented with nearly 600 precious stones. It has little value beyond that of the stones, which are certainly very fine ones.

Messrs. Heaton, Butler, & Bayne, Messrs.

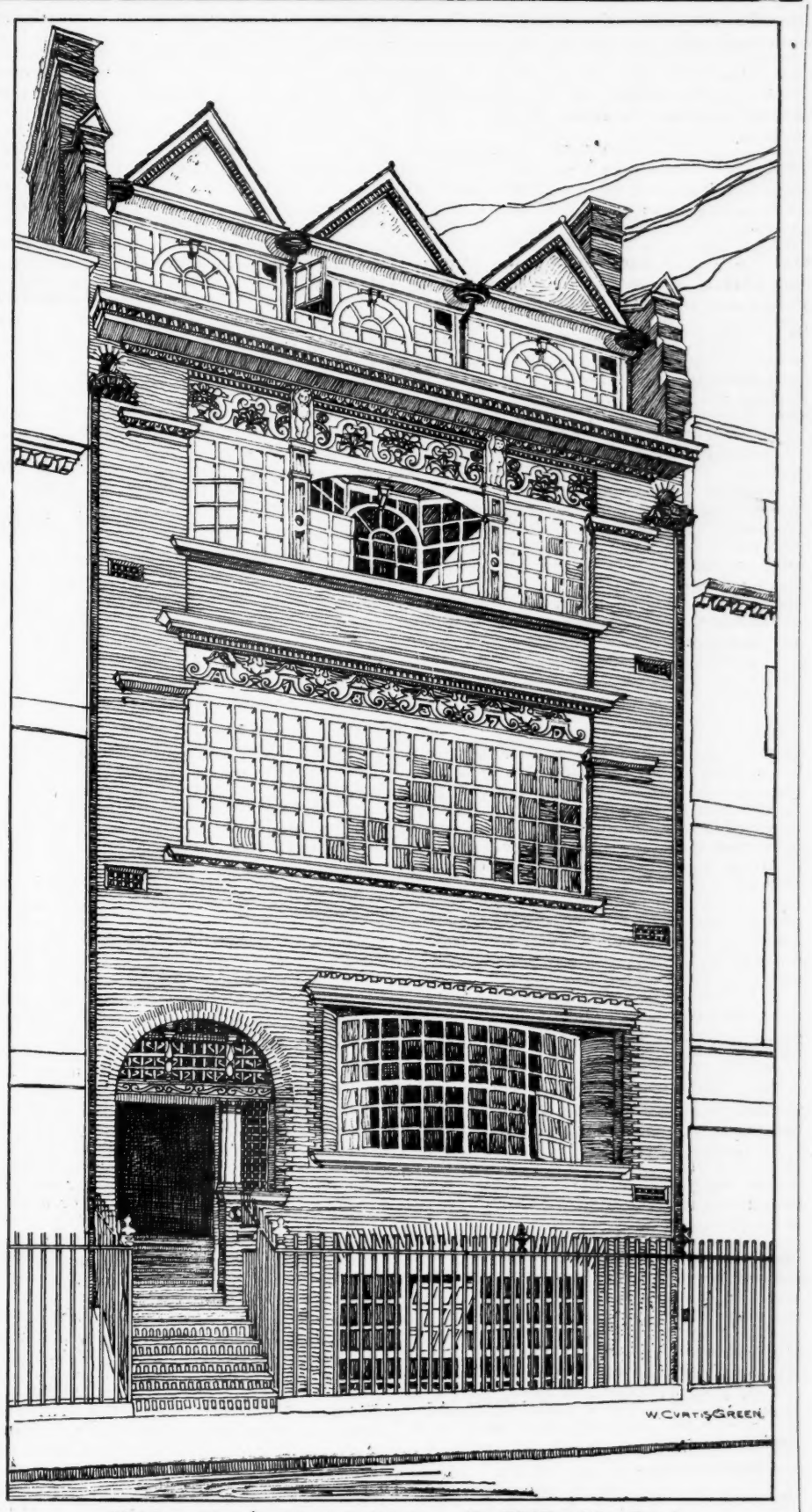
Jones & Willis, and Messrs. Mayer & Co., of Munich, exhibit stained-glass windows; they are all rather poor in design and drawing and colour; that of Messrs. Mayer & Co. belonging to the stained-glass period of 1850. This firm also shows a "Gothic" reredos in carved wood representing the Last Supper in a framework of the usual crocketted pinnacles and cornice. Of embroidered altar fronts there are many of the usual trade kind. Messrs. Austin & Paley and Mr. Knill Freeman show drawings of good modern Lancashire churches. One large case contains the Bradford Corporation plate; this is not ecclesiastical, its date is 1873, and, as it has no artistic value, one wonders why it is here.

We are sorry to have had to speak so severely of the modern work in the loan collection, and turning now to the general exhibition we cannot spare our condemnation here. Various firms exhibit the average collection of cheap crosses and candlesticks which usually fill the ordinary ecclesiastical shop, one of them showing no less than six samples of the usual cast brass eagle lectern. Messrs. Kayll & Co., of Leeds, show an altar panel in "opus sectile," which is better than most of the things in the exhibition, and has some good colour. Mr. A. O. Hemming, of Margaret-street, London, has a collection of drawings of church decoration and stained glass, some of which we are sorry to see has been carried out in Canterbury Cathedral; his designs are in the ecclesiastical decorator's Gothic manner. The educational part of the exhibition consists of books, stationery, &c., but chiefly illustrates what to avoid in furnishing a church. If one is to judge by the art work of this exhibition, then ecclesiastical art has come to a low ebb indeed. If the clergy wish to encourage art, then the exhibition should be reduced to about half the size, and only old work and specially invited and more personal modern work should be included. The art section should also be separated from the educational.

OFFICE FRONT, No. 8, GREAT GEORGE-STREET.

THE houses in Great George-street, originally built for residences, are now used as offices. In 1884 No. 8 was considerably damaged by fire, and it was determined to rebuild it in accordance with its present purposes. Accordingly, the height of the basement floor was considerably increased, and the attic story made of a good height and well lighted throughout. These conditions caused the violent disregard of the horizontal lines of the adjacent buildings, and the general independent character of the façade, as at present it stands. But it is almost inevitable that, owing to the value of the site, the remainder of the street is doomed to some such similar alteration, and that what now appears aggressive will merge into some conformity with its neighbours, as rebuilt. The materials—salt-glazed bricks and plate-glass—are, perhaps, the most unexceptionable for manufacturing and smoky towns.

HALSEY RICARDO.



Sketches of London Street Architecture. No. XXIX. Office Front, No. 8, Great George-street, S.W.

MODERN SANITATION.

BY W. HENMAN, F.R.I.B.A.*

SANITATION extends over so vast a field of scientific research that it is impossible for an architect or engineer nowadays, actively engaged in his profession, to do much more than watch the rapid developments brought about by many indefatigable workers in numerous fields of investigation, and intelligently to take advantage of the knowledge acquired by others, so as to apply it in the works with which he may be entrusted.

Engineers and architects are then the active agents by whom sanitary science is practically applied in permanent works for the benefit of mankind.

The noblest undertakings of modern engineers are those which tend to secure the health and well-being of communities, such as the provision of pure and abundant water supplies, drainage, irrigation, the supply of gas and electric lighting, the construction of railways, canals, bridges, docks, shipping, and other means of transport by which food and clothing are brought to our very doors, often from distant localities of production, and by which many are enabled to leave the crowded streets of cities and towns, to breathe the purer air of the seaside and of country places.

The natural tendency of the human race is ever more and more to congregate and form communities; it is then only by united action and expenditure that health can be maintained. Wherever such, however, is adequately exercised, statistics will show that vast populations may live within a limited area and enjoy as good, if not even better, health, than those in thinly inhabited districts where co-operation as regards sanitary matters cannot so readily be brought about.

Now that walled-in cities are no longer a necessity for protection, there is little reason why overcrowding should exist; there is generally open country around allowing, in most cases, of almost indefinite expansion, so that with good roads and easy means of conveyance from one quarter to another, large communities may dwell together, and by united action secure better health and greater comfort for the many than is the lot of those living in sparsely populated localities.

It is among these large communities that architects find their chief employment. It is expected of them not only that they will provide protection from the elements in the homes of the people, but that such will be healthy, safe, and pleasant places of abode; in addition to which they are entrusted with the erection of numerous buildings of public character, such as schools, hospitals, asylums, places of worship, assembly halls, hotels, theatres, shops

* Address delivered before the "Engineering and Architecture" Section of the Sanitary Institute Congress at Birmingham, on Thursday, September 29, by Mr. W. Henman, President of the Section.

manufactories, and business premises; in one and all of which the amount of care and attenon bestowed upon their design and constructtion, may very materially affect the safety, health, and well-being of a neighbourhood, and of numerous individuals, perhaps for generations.

It is well to impress this fact upon the public mind on occasions such as these congresses afford, and to insist that the function of architects is not alone to produce artistic designs and decorations, but by a careful application of sanitary science, a knowledge of natural laws, of the nature and properties of building materials, of the earth's surface on which they build, and of the air we all breathe, so to design and construct the edifices they erect that, without being devoid of suitable artistic expression, they may be convenient in arrangement, safe in construction, free from sanitary defects, or such as might cause bodily hurt, mental trouble, or untimely death.

That the public have not always, and do not even now in every case demand this, must be evident. Too often, through ignorance, or on grounds of false economy and favouritism, is the prentice or inexperienced hand employed. Consequently, as individuals either cannot or will not take care that safe and healthy buildings are erected for their use, the Legislature has stepped in, and by various Acts of Parliament, local by-laws, and numerous officials, endeavoured to safeguard individuals and communities.

The effect of this system is perhaps as good as can be expected, but it appears to me unduly to relieve many of personal responsibility which it would be better they should bear, and, because of the inflexible nature of all regulations, if strictly enforced, hardships in some cases must result, or where there is laxity, evasion is sure to follow; but the greatest evil is the lack of impartiality in administration apparent in some localities, so that instead of inspection and regulation, there is too often dictation and interference at the caprice of authorities or their officials, who may consider they have a right to interpret by-laws as they please, whether or not safety or health is in question; such action is not for the good of the community, individuals are irritated, and sanitary progress is retarded.

Moreover, in matters of sanitation there is much yet to be learnt, and there is reason to doubt the wisdom of many regulations which have from time to time been laid down in connexion therewith.

There seems to be a law of evolution in sanitation as in many another subject. Consider the degrees of advance in connexion with the disposal of fæcal matter. Not so very many years ago every house had its privy, little more than a hole in the ground, close to the dwelling, where month after month excrement was allowed to accumulate; the fluid filth saturated the ground and contaminated the water supply drawn therefrom, while the putrifying solids poisoned the air around. Then came the cess-pool, more or less removed from the dwelling, and the water-closet developed; at first simply a pan down which an occasional bucket of water was poured to convey away the solids, then a water-pipe with tap was provided for the same purpose; odours became unpleasant, to say the least, so the "D" trap was invented, and following thereon the pan closet—that filthy retainer of fæcal matter, still unfortunately to be found in many a house. Public sewers for conveying the objectionable matter to a common outfall were extended. Varieties of valve closets were introduced, and next came the "washout" pan, with a flushing cistern which, when acted upon, simply lifts the contents of the pan into the trap below, until another flush, perhaps hours after, causes it to move on. Now we have the "wash-down" and "syphonic" pans, which at each flush ought to be thoroughly cleared; but the same bodies who are appointed to regulate sanitary matters in the interests of the community, if they control the water supply, rarely permit more than a two-gallon flush, which generally proves insufficient for the purpose.

How reluctant some sanitary authorities are that we should be rid of our filth, and how they have from time to time retarded the natural order of development, notably by adopting such clumsy devices as the pan collecting system. It is, in fact, only by painful steps that excreta and other foul matters have been expelled from the near neighbourhood of dwellings. Not long since, in many districts, a "trap" was required at the foot of every soil-pipe, where each discharge was stopped on its way immediately outside the house; there it remained until another discharge came to shift it onward. Even now the "trap" is simply moved on to the boundary of the site, often but a short distance from the dwelling. I predict the day will come when all such "interceptors" will be banished, together with every other "trap" and impediment outside of buildings, then there will be little, if any, of that half putrescent matter now so often retained about buildings, creating sewer gases which find their way into our homes or assail our olfactory nerves as we pass along the streets and highways.

Useful as manholes and inspection chambers may be when judiciously placed, there are some localities where their unreasoning multiplication must in time cause serious nuisance. Where their number is excessive they retard the scour of the sewer and often become mere cesspools; filth is deposited around the sides, from which sewer gases are generated. Unfortunately, large pipes and the excessive employment of traps, manholes, and inspection chambers are the panacea of inexperience in those who undertake sanitary work.

With every house drain of suitable size well ventilated at its highest point by being carried straight up its full diameter clear above all windows, with plenty of street gratings for fresh air inlets to the sewers, ample flush of water, impervious and well-laid drains and sewers, all untrapped and free from obstruction, sewer gas, now so well known, might become a thing of the past only to be met with in laboratory experiments.

So soon as a drain from one dwelling joins another, according to law as at present laid down, it becomes a sewer, and from that point the architect, as such, has nothing more to do with it. The sanitary engineer then steps in. It is he who is responsible for the design and construction of the many arteries of pipes and conduits by which sewage is conveyed to the outfalls.

Much as architects may have erred in permitting defective construction in drains, others have sinned more deeply in the matter of sewers. Apart from their general design, the method of construction, and gradients adopted, actual work has too often been defective in execution, so that, instead of aiding the quick removal of solids by water carriage, they have acted as filters or separators, permitting the fluids to escape and soak into the ground or to run off and leave the solids to fester and become offensive.

I am, of course, speaking of what has happened in the past—no sanitary authority, architect, or engineer would now think of permitting such defects to occur. Yet, unfortunately, all are not agreed as to the necessity for preventing the formation of sewer gases, or even in accord as to the best methods of doing so, and, strange to say, although some of the "ills to which flesh is heir" have undoubtedly been traced to the action of sewer gas, there are many keen observers who point to the general good health of sewermen and, failing to detect the deadly bacilli in its most concentrated essence, infer that, after all, sewer gas is but a harmless though somewhat unpleasant guest. Others go less far, and, while pronouncing it harmless within the sewers or playing about the streets, will yet condemn it as a burglar and murderer should it enter a dwelling. Notwithstanding this divergence of opinion, and although sewer gas may not on every count have been found guilty, it is undoubtedly more prudent to regard it as a suspect, to permit it no entry to our dwellings, and to banish it from the streets and public ways. At the same time, care must be taken not to imprison it within the sewers, for then it becomes more virulent and, should it find a loophole for escape, it may work untold ill.

In other sections during this congress much will doubtless be heard of sewage disposal, a subject of the greatest interest to sanitarians. A new era with regard to that question may be upon us, if what is now known as the "septic tank" fulfils the promise of its so-far rapid advance in public estimation.

Facility of disposal implies greater possibility of rapid removal from the neighbourhood of dwellings; and if what is claimed for the septic tank proves to be true, a dual arrangement of sewers and storm-water drains will be unnecessary. The periodic falls of rain can then, by means of collecting tanks or reservoirs, be utilised as a constant means for flushing and cleansing drains and sewers; because it is held that, whatever the volume of the effluent, it may with safety be turned at once into the natural watercourses.

Sanitation has to deal with many subjects quite as interesting, if not so savoury, as sewers and drains. Every building we occupy, the houses in which we reside, the water or the fluids we drink, the food we eat, the air we breathe, the clothes we wear, the work we do, the recreation we take, all exercise their influence for good or ill upon health.

Because some diseases are marked in their characteristics, and frequently become fatal within comparatively short time, their causes are zealously traced and safeguards are devised. Yet how many continually suffer ill-health, are deprived of full vitality and capacity for useful employment and enjoyment in life, resulting, in the majority of cases, I do not doubt, from neglect of sanitary laws. But because the immediate effects are not made apparent, the causes are more or less ignored, investigation is imperfect, knowledge is indefinite, and popular prejudice is often at fault.

Careful and constant observation of cause and effect, together with frequent exchange of the views and ideas of observers and thinkers, may in time elucidate much that is now obscure regarding what is requisite for the health, strength, and consequent happiness of mankind. "Prevention is better than cure."

Probably the greatest obstacles to the advance of sanitary science are popular prejudice and the unreasoning adoption of materials, means, and methods which may be good under certain circumstances or conditions, but the cause of evils when wrongly applied or employed.

In this connexion is the question of the proper use of certain building materials. In most books on building construction will be found advocated, without qualification, as a rule, the employment of hard and impervious materials. Popular prejudice catches at the idea that hard materials must be the best and strongest, and those that are impervious must secure dry buildings, consequently the hardest of stone, the most highly-pressed bricks and tiles are demanded. In the daily press there is frequent advocacy for the employment of glazed materials for the entire exterior as well as the interiors of buildings, and in a few cases the suggestion has been followed; yet I find there are many observant architects who persist in what they consider better methods of construction. They seek for materials of pre-meable structure, having surface texture and variegated tones, with which they build in such a manner that, while securing adequate strength, there is no waste of good material. I venture to believe they are rightly aiming at a scientific method of construction, the best suited to secure health and comfort for the occupants.

To go into all the reasons of the why and wherefore would be out of place in an address such as this, but, broadly regarded, the difference is on a par with clothing oneself nowadays in a suit of steel plate armour instead of in good woollen material; the plate armour was of some value doubtless in the days of hand-to-hand combat, but even then only employed for the purpose of protection. As a daily garb it would be ridiculous in appearance as well as injurious to health and comfort; whereas a suit of woollen material is serviceable and greatly to be preferred. From this comparison I must leave you to draw your own inferences.

Ventilation is another subject of primary importance trom a sanitary point of view. How glibly most people will talk about it, and yet how little is it understood by the general public. Popular prejudice and ignorance too often frustrate the best endeavours of those who have studied the subject and apply the knowledge they have acquired.

Is it always remembered that regulations respecting the width of streets, the height of buildings, the prevention of overcrowding, the proper construction of sewers and drains, the cleansing of thoroughfares, and particularly of courts and alleys (which, by the way, ought not to be allowed to exist if every individual had a proper regard for his own and his neighbour's health and well being), the quick removal of refuse animal and vegetable matter from within and around dwellings, an ample water-supply for domestic and cleansing purposes, the provision of electric lighting, and many another duty laid upon district authorities, have one and all a direct bearing upon the maintenance of the atmosphere we breathe

in a state of suitable purity, without which efficient ventilation is impracticable?

Fortunately, in this country it is possible in most dwelling houses to employ natural means for securing an adequate change of air on almost every day in the year. Yet there is much that an architect may do, by care and forethought, in planning, in the employment of suitable materials, and devising means so that such necessary change of air within may be brought about in a manner to secure comfort to the occupants. It must, however, be remembered that without due care and intelligent attention on the part of the occupants, efficient ventilation cannot be maintained.

In many buildings erected for public use the case is often different. Natural means cannot always be relied on for securing efficient ventilation, because mere change of air is far from being all that is implied by the term. In addition there must be suitable temperature and humidity of the atmosphere, as well as freedom from draughts. To meet these requirements mechanical means must be resorted to.

I venture to point with some degree of pride to one of the largest installations ever laid down, viz., that at the General Hospital in this city, a building erected from my designs. To Mr. William Key I give all credit for devising the engineering requirements for heating and ventilating that building; but I have no hesitation in saying, and feel sure he agrees with me, that success in such an undertaking is best secured when the architect, having made himself thoroughly acquainted with the requirements by which good ventilation can be obtained, works hand in hand with the ventilating and heating engineer, and designs the buildings on lines best suited to the methods to be adopted.

Frequent failures there have been in applying mechanical means for securing ventilation in large buildings. It is well to face that fact, and to realise the vast amount of prejudice resulting therefrom. My investigations convince me that such failures result from three primary causes:—

1. Too low an estimate of the volume of air required.
2. Want of efficient mechanical appliances.
3. Want of constant and intelligent management.

With regard to the first, even recent writers upon the subject of ventilation give a change of air three times per hour as a suitable requirement, and many professed ventilating engineers base their estimates on such inadequate provision. One firm had a laudatory article in a sanitary journal (?), recently published, of a newly introduced appliance, by which it is claimed that change of air within an apartment can actually be brought about *once* in every hour.

So long as architects and the public shut their eyes to the ascertained fact that a change of air from seven to ten times per hour is essential for health and comfort, failure must inevitably result.

The perfection to which mechanical contrivances can now be brought, and the ease with which electricity may be employed for motive power, make it practical to secure an adequate change of air within a building, however complicated may be its plan and arrangements.

The internal capacity of the General Hospital, Birmingham, equals two million cubic feet, and provision is made for propelling a total of twenty million cubic feet of cleansed and tempered air throughout the buildings every hour continuously, night and day.

The experience I have gained in this and other buildings, similarly ventilated on the plenum system, enable me to assert without hesitation that, with an adequate expenditure upon a properly equipped installation and careful management, there is no reason why efficient ventilation and warming should not be secured in every public building, with absolute freedom from harmful draughts.

The provision of dwellings for the working classes has for many years occupied the attention of sanitarians; because permanently good health cannot be secured in defective dwellings, and unless the health of the largest class is maintained, it constitutes a source of danger to the rest of the community. There are many reasons why homes for the labouring classes are often defective, but there is one reason which more than any other tends in that direction—it is the system of creating excessively high ground-rents.

There is a limit to the amount of rent which it is possible for working men to pay, consequently if the ground landlord is grasping in his demands there is little capital left to be expended on the buildings, and, therefore, they are scamped. I am no Socialist in the ordinarily accepted sense of the term, but I realise most strongly that the excessive value put upon land for building purposes—particularly that required for the houses of the working population—is a leading cause of bad building, the result of which is impaired health in the community from which the landowner, as well as members of his family, may perchance suffer more severely than they would from a slightly reduced income following upon less exorbitant demands for ground rent.

I must not trench further upon your time. This phase of the question may be treated in the paper promised to our section, and there are other papers which should claim your attention. It is to be hoped the discussions which may follow upon them will add to our general sum of knowledge, possibly we may not all be of one mind on the subjects to be brought before us, but if each will approach them with a sincere desire to evolve the truth, there can be little doubt the result will be individual benefit and ultimate good to the community.

THE ARCHITECTURAL ASSOCIATION:

SUMMER VISITS.

THE last summer visit of the Association took place on Saturday, September 24, when a party, including the President, went down to Rochester. At the Cathedral the visitors were met by the Dean, the Very Reverend S. Reynolds Hole, by whose permission the visit took place.

Mr. Payne, the Honorary Secretary of the Kent Archæological Society, conducted the visitors over the cathedral, and pointed out the various features of interest with which the structure abounds. In a slight notice of the early history of the town, Mr. Payne mentioned that the first church was founded in 604 A.D. by Justus, the first Bishop of Rochester. The outlines of the eastern end of this church, having been discovered in recent years near the west end of the cathedral nave, have been marked on the pavement of the latter by the order of the Dean and Chapter. This first church terminated in a semi-circular apse. After a short description of the main features of the building, and the dates at which they were erected, Mr. Payne explained the reason for the close proximity to the Cathedral of a separate church by recounting how the parishioners of St. Nicholas, having an altar in the Cathedral, had disputes and disturbances with the Monks who had their celebrations in the choir, and in order to obviate this, the latter granted to the parishioners the ground adjacent, whereon they built themselves a separate church.

The central tower, built by Hamo de Heve in the thirteenth century, was cased externally in 1825 by Cottingham, and so pleased were that architect's patrons with his work and design that he was presented with an honorarium of 100*l*. The sequel to this is interesting, for the Dean showed the visitors Mr. C. Hodgson Fowler's design for the remodelling of the tower from the roof upwards and the replacement of a short lead-covered spire after the manner of that removed by Cottingham. This resembles the healthy disregard shown by mediæval builders for the work of their immediate predecessors. Passing into the choir, Mr. Payne pointed out the coloured decoration on the walls, executed by the Heralds' College. In design it is said to be a copy of the original decoration of which, indeed, there are some remains, but in execution it is hard and uninteresting to the last degree. There are many other efforts at decoration about the choir which are, sad to say, but sorry testimonials of the artistic powers of the English of the nineteenth century.

Many interesting tombs were pointed out, among others that which is with some doubt conjectured to be the tomb of William of Perth, the patron saint of Rochester. It was from the offerings at the shrine of this saint that the expenses of the building of the choir were defrayed by William of Hoo, sacrist, between the years 1115 and 1124. Two other interesting tombs are that of John de Sheppey, bishop, whose recumbent effigy is fully painted, and that of Walter de Merton, the founder of Merton College, Oxford.

From a will of a former bishop, it has been ascertained that the cathedral once possessed a golden figure of St. Andrew. The existence of this figure was till recently unknown. A portion of a wall painting, representing the wheel of Fortune, was exposed in recent years, on the removal of a pulpit, and is still to be seen on the north wall. The cloister garth, with the few remains of the Norman arcades, were next inspected, after which the very fine and extensive crypt, partly Norman and partly Thirteenth Century work, was visited. In one portion of this are stored all sculptured fragments found about the cathedral, and there are some exquisite remains of the canopy of the tomb of John de Sheppey.

By the permission of Mr. Aveling, the owner, and Major-General White, R.E., the occupier, of Restoration House, the party next visited that interesting Jacobean mansion. As is well known, it derives its name from the fact that Charles II. slept there on his way back to London for the Restoration. The house has rubbed brick rusticated dressings round its moulded oak mullioned windows; it has also a fine main staircase and other interesting details of woodwork, besides which there are a series of wall-paintings, executed by Mr. Aveling himself, in a broad and decorative style.

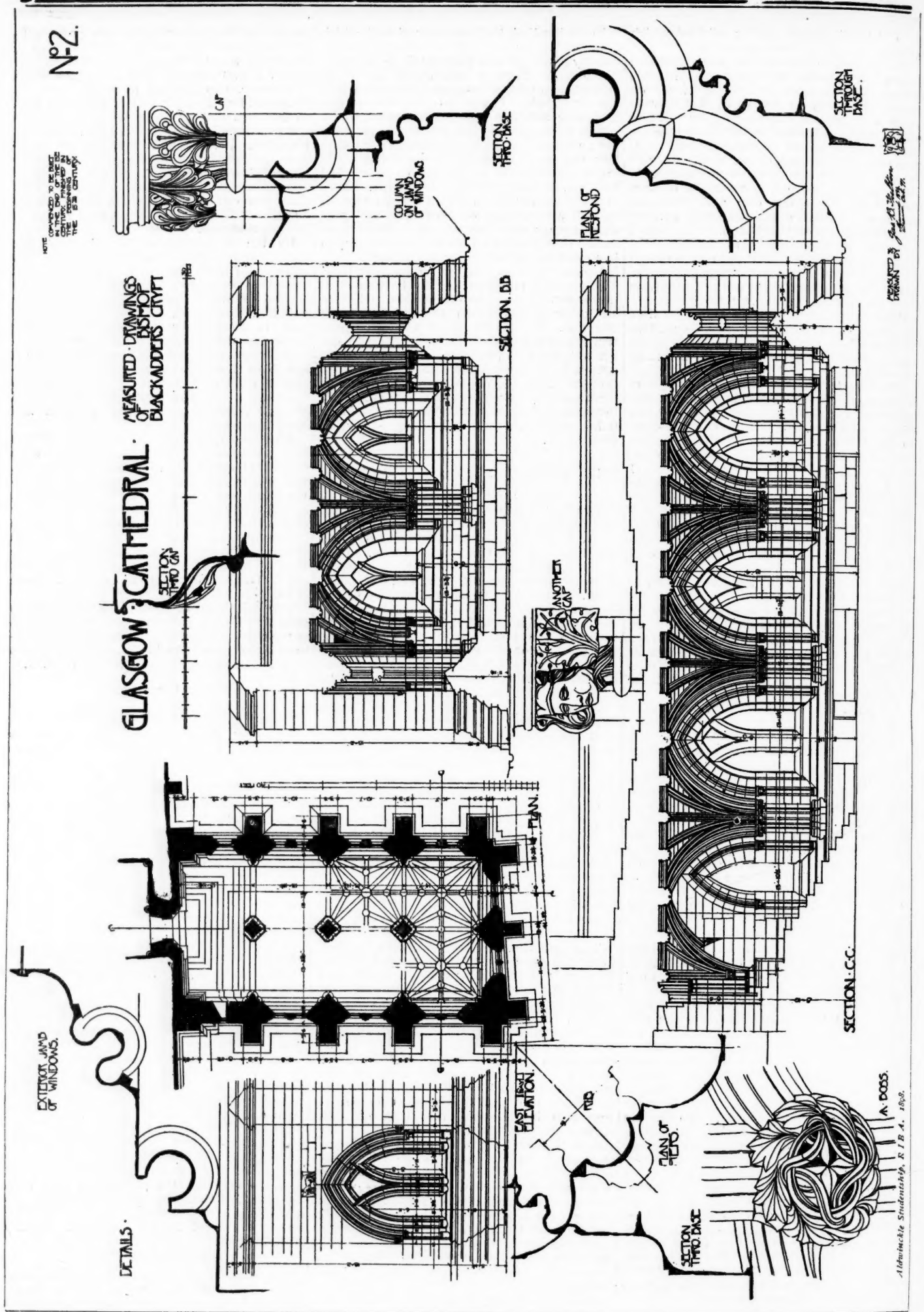
After leaving Restoration House, the visitors returned to the Deanery, where they were hospitably entertained. Before leaving, Mr. Fellowes Prynne proposed a vote of thanks to the Dean, which was carried by acclamation. Subsequently Mr. Payne conducted the party to the Castle, where he explained the nature and history of the wall of the outer bailey, and pointed out several interesting features in the Keep. He also stated that the Keep was built not by Gundulph but by Archbishop Corbeuil in 1126-39.

The enjoyment of the visit was very much enhanced by Mr. Payne's admirable exposition of the chief points of interest, and the Architectural Association owes him very hearty thanks for his kindness and courtesy. W. B. H.

ARCHITECTURAL SOCIETIES.

GLASGOW ARCHITECTURAL ASSOCIATION.—On Tuesday evening, September 20, the opening address of the winter session was delivered by Mr. Geo. S. Hill, President, his subject being "Architectural Tradition and Precedent." The distinction implied between the terms was gone into closely and clearly, noting that the acquaintance of history of any particular branch of work was invaluable for many reasons, but at all times the element important to us, which is entirely absent from the past, was the present, and all that it implies. Every young designer was advised to obtain a clear and articulate idea of the position held by these great factors, as by their aid the superficial attractions of quaintness and eccentricity can be evaded when his hand can be laid upon what he knows infallibly to be good. It requires but a lively, if not over-refined, fancy to impart to present conditions a clothing never before represented. This is all that much of the modern work has to depend upon. In it ofttimes lies something analogous to the abnormal, the freak in nature which is never pleasing. The *rationale* of such architecture is in the designers themselves, and they are the only court of appeal by which it might be judged, taking refuge from outside criticism behind the assertion, "but you do not understand." Mr. Hill pointed out that the great epoch-making features and characteristic forms were not the outcome of any feverish desire for something new, but came by the pressure of their own manifest advantages, and concluded his address with the truism, "That to advance wisely we must refresh ourselves liberally from the past."

RESTORATION OF ST. MARY'S CHAPEL, ABERDEEN.—This work has now been finished, and the re-dedication ceremony takes place to-day (October 1). The old oak panelling has been fitted up as a dado round the chapel. The arms of the city of Aberdeen are represented in a panel used as a pulpit back, and the pulpit is surmounted by a canopy also of old material. The Holy Table is of Corennie granite, and on it are two decorative lead panels containing the arms of Lady Elizabeth Gordon, who founded the chapel, and of Sir John Gordon. The building was formerly known as Cocklarachie Chapel. In modern times it has served as a meeting-place for the Presbytery of Aberdeen. Messrs. A. Marshall Mackenzie, G. G. Jenkins, and W. Kelly, of Aberdeen, were the architects.



BISHOP BLACADER'S CRYPT, GLASGOW CATHEDRAL.

Bishop Blacader (for that is the true spelling of the name, though we observe that Mr. Fulton has made it "Blackadder" on his drawing), who was appointed in 1484 to the See of Glasgow, paid a great deal of attention to the beautifying of the Cathedral, having erected the screen between the nave and choir, besides other additions, among which the crypt here illustrated was the most important. It projects from the south transept, and is traditionally said to cover the spot where Saint Ninian was buried in the fifth century.

The crypt is entered by a doorway leading from the south staircase to the lower church. There is a curious want of parallelism in the plan, the reason of which is not apparent, and has been the subject of a good deal of discussion. The effect of the interior is very good, both from its massive style of work and the excellent character of the vaulting and the carving. It is of the date of about the end of the fifteenth century.

The measured drawings, which are by Mr. Jas. B. Fulton, formed a portion of the drawings for which the Aldwinckle Studentship was awarded by the Institute of Architects this year.

New Doors to Choir Vestry, Tadcaster Church. Messrs. Bromet & Thorman, Architects.

NEW CHOIR DOORS, TADCASTER CHURCH.

As mentioned on another page, the Church of St. Mary at Tadcaster has been re ently enlarged. The drawing here given shows the new doorway and oors to the choir vestry, which are executedn oak with tracery panels and leaded lights. Under the cornice is carved a representation of the Wise and Foolish Virgins.

Messrs. Bromet & Thorman are the architects. The drawing of the doorway was exhibited at the Royal Academy this year.

THE SANITARY INSTITUTE CONGRESS' BIRMINGHAM.

THE seventeenth Congress of the Sanitary Institute is being held at Birmingham this week, the proceedings having commenced on Tuesday with a reception in the Council Chamber, Council House, by the Lord Mayor of Birmingham. Very complete arrangements have been made for the success of the gathering, several public buildings having been set aside for the purposes of the Congress. The general reception-room, which includes inquiry office, reading-room, &c., is located in the Town Hall, Paradise-street, and the conferences, meetings of sections, presidential address, &c., have been carried on in three different buildings, viz., Mason University College, the Birmingham and Midland Institute, and the Council House, while the Health Exhibition has been arranged in Bingley Hall.

In addition to five conferences, viz., Municipal Representatives, Medical Officers of Health, Municipal and County Engineers, Sanitary Inspectors, and a conference of ladies, the work of the Congress is being carried out by the following sections, viz.:—Sanitary Science and Preventive Medicine (Dr. Alfred Hill, President); Engineering and Architecture (Mr. W. Henman, President); and Physics

Chemistry, and Biology (Dr. G. Sims Woodhead). The Congress is being attended by about 1,600 members and visitors, and by 800 delegates from various sanitary authorities.

At the reception of the members in the Council Chamber, the Lord Mayor (Mr. Councillor Beale), in welcoming the Institute, said that the Congress would find no lack of interest in Birmingham.

Sir Douglas Galton, Chairman of the Council of the Institute, briefly acknowledged the Lord Mayor's welcome.

Major Lamorock Flower also thanked the Mayor on behalf of the members, as did Sir Joseph Ewart on behalf of the delegates.

An adjournment was then made to the Grand Hotel, Colmore Row, for luncheon. The Mayor, who presided, proposed the toast of "The Sanitary Institute," and referred to the fact that the Institute has been in existence twenty-two years, having been established in 1876. He directed attention to the educational work of the Institute, and referred to its examinations for sanitary inspectors.

Sir Douglas Galton, in response, said he had been associated with the Institute since its foundation. He thought the present meeting would be the most successful gathering they had ever held.

Sir Joseph Fayrer, President of the Congress, submitted the toast of "The Lord Mayor and Corporation of Birmingham," and Mr. Alderman Cook responded.

The President's Address.

An adjournment was then made to the Birmingham and Midland Institute, where Sir Joseph Fayrer, Bart., delivered an inaugural address. In the course of his remarks he said he proposed to take a brief general survey of progress during recent times. Among many subjects of interest which were laid before the Queen on the completion of the sixtieth year of her reign, few, perhaps, if any, afforded better ground for congratulation than the improvement in the vital statistics of her people, as shown by reduced death-rate, enhanced expectation of life, decline in some of the most potential death-causes, and the almost total disappearance of others. In effecting this improvement the Institute had taken an important part. It was the outcome of the impulse given to sanitary science by the Public Health Act of 1875, which itself was a result of the growing conviction that public health was a subject which demanded more consideration than it had hitherto received. The object which the Institute had kept steadily before it from the outset had been the advancement of sanitary science by the promulgation of sound scientific and practical teaching of those principles on which health depends, by which life is prolonged, and the physical and thereby the moral welfare of the people promoted. Its work was effected entirely by private enterprise, unaided by any subsidy either from Government or other public authority, by which it was from time to time consulted, and to which its services were most willingly rendered. As an illustration of the progress made it might be stated that when the first Congress took place in 1877, there were 150 members and the income was 240*l*. In 1896 the members were 2,100 and the income 6,000*l*. In 1877 five candidates were examined for certificates, in 1896 521 were examined, of whom 300 obtained certificates. But the Sanitary Institute was by no means the only source of instruction in matters relating to hygiene and preventive, or State medicine, for all our medical schools and universities, the Army and Navy Medical Schools at Netley and Haslar, and many technical schools now gave instruction in those subjects,and the universities and Colleges of Physicians and Surgeons attested the fitness of candidates for the diploma of public health. One great national reproach, moreover, had lately been removed by the foundation, by private enterprise, of the Institute of Preventive Medicine, with which was amalgamated the College of State Medicine. The object of this Institution was to search out the causes of disease, a knowledge without which we could not hope to deal effectively with modes of prevention. The Medical Departments of the Navy, the Army, and the Local Government Board, the Army Sanitary Committee, the Royal Institute of Public Health, many municipal and rural health societies, and societies of Medical Officers of Health, were actively employed in extending the practical application of the knowledge imparted by the various educational institutions as well as by individual research. It was only comparatively recently that preventive, as distinguished from curative, medicine had assumed the position of a science at all; it was now, from a hygienic point of view, the more important of the two, though the difficulties attending its application were still considerable and largely such as arose from ignorance and incredulity. Half a century ago the great mass of the population lived and died under conditions which violated all the now well-known principles on which health depends; prejudice, ignorance, and vested interests stood in the way of progress, and but little effort was made to correct the one or remove the others; Government looked on with indifference; the people knew little, and thought less, of the efficacy of pure air, pure water, cleanly and uncrowded dwellings, temperance, and other conditions which were now well known to be essential to health. They had no idea that infective disease was but too frequently the scourge of uncleanliness, overcrowding, and disregard of simple laws of health. Under the influence of such reformers as Chadwick, Parkes, Richardson, Simon, Southwood Smith, Sutherland, Bristow, Buchanan, Netton Radcliff, De Chaumont, Corfield, Thorne, Notter, Seton, L. Parkes, Ballard, Power, A. Hill, Armstrong, Russell, Littlejohn, Cameron, Smith, Ransom, and others, to say nothing of Sanitary Engineers such as Rawlinson, Galton, Rogers Field, Hawkesley, Mansergh, &c., measures which were regarded as mere theories or fads of no practical value, were now accepted as of cardinal importance. Statesmen had learnt to realise that Sanitary Science came well within the sphere ot practical politics, and that it was an important part of the duty of executive governments, whether general or local, to protect the people from disease which might be prevented or controlled. Numerous Acts of Parliament had been passed, such as the Public Health Act of 1875, Rivers Pollution Prevention Act 1876, Public Health (Water) Act 1878, Acts for Housing the Working Classes 1885 and 1890, Infectious Diseases Notification Act 1889, Infectious Diseases Prevention Act 1890, Isolation Hospitals Act 1893, Public Health Act for London 1891, and many others. Officers of Health, Sanitary Engineers and Sanitary Inspectors had produced a better state of things; the poor were no longer left to be a law unto themselves on such matters. Public health was cared for in a sense which was utterly unknown in the past; houses were better built, sewerage, drainage, and ventilation were provided for, the land was better cultivated, the subsoil better drained; the absolute importance of pure drinking water was recognised, food was more varied and more nutritious in its character, clothing was better adapted to climate; and were all the existing official provisions enforced, little would remain to be desired on the part of the executive government; but as some of these Acts were permissive, not compulsory, and as others were utterly neglected, much of the benefit they might confer was lost. Though education had done much as far as the better classes were concerned, and upwards of two hundred millions had been spent on sanitary work, with great benefit to the public health, popular teaching and example, and the general diffusion of education, were still necessary in order to convince the proletariat of what so intimately concerned their vital interests. The death-rate was susceptible of further diminution, expectancy of life might be enhanced, and the general conditions of living and exemption from certain forms of disease were by no means as perfect as they might be; tainted water was still drunk, as was illustrated by the condition of Maidstone and Lyme Regis last year, where an extraordinary visitation of typhoid fever was traced to impure water, showing either that legislation was imperfect or that its provisions had not been duly observed. Chimneys still vomited forth their smoke and chemical fumes, rivers were still polluted, cesspools and imperfect drains, badly constructed, ill-ventilated houses, and so on, still defied alike the sanitary law and common sense; and it would, perhaps, not be until the more complete organisation of the public health administration under a Minister of Public Health was effected, that the full benefits of sanitary legislation would be realised and the people attain to that standard of health and duration of life for which they had a right to hope. Even our great cities with all their improvements left much to be desired. Notwithstanding Acts of Parliament, all the efforts of sanitary authorities, all the advice that might have issued from this and other similar sources, serious defects remained.

The President, having referred to the rate of mortality in large towns, and having quoted Sir Henry Burdett in regard to certain health matters in London, spoke of the abominable and insanitary practice of sending out the vestry dust-carts to take away the house refuse at all times of the day. This proceeding was not only offensive to the eye and nose, but prejudicial to health. It ought to be promptly discontinued, and on no pretext ought dust-carts to be allowed in the streets after an early hour in the morning. Recent discussions in the House of Commons showed that the question of pure-water supply also had not yet been satisfactorily settled or brought under the control of the sanitary authorities. It was to be hoped that disputes upon a question of such vital importance would not long remain unsettled. Nevertheless, when we contrasted the present state of our country with its twenty-nine millions of inhabitants, with that of the Elizabethan era with its four millions, we had ample proof of the ignorance of science in those days and of the great improvements which had taken place in these. When we thought of the ill-ventilated dwellings, the ill-built towns and villages, the narrow, unpaved, unlighted streets, uncultivated, marshy country, unreclaimed land, the wretched houses, often of wood or earth, without drainage or ventilation, with floors covered with straw or rushes saturated with filth and reeking with noxious miasmata, the stagnant gullies and open cesspools, to which must be added the wretched diet, the intemperate habits, and frequently the most impure water, we could understand how under such conditions disease found a congenial nidus, and frequently assumed the epidemic proportions in which it proved so destructive to life. But could we feel confident that our immunity could continue? He was afraid not. Sudden invasions of cholera and other epidemics, and, as now, of plague in India, were warnings that our vigilance must never be relaxed. But the experience of our country under the greatly-improved sanitary administration of the present time had shown how much we might rely on preventive measures wisely enforced, especially when these were based on experience and enlightened observation, and not upon mere theories of causation.

The President then dealt with the statistics of some well-known diseases, showing that they had become less severe in their incidence if not less frequent in their recurrence, and how far they were thus subject to the influence of hygienic measures. Continuing, he said one indication of the effect of sanitary work was observed in the death-rate of the country. In 1841-50 it stood at 22·4 per thousand; in 1891-95 at 18·7 per thousand; but for the four years 1890-1893, it had risen owing to epidemic influenza, the lowest rate, 1884, having been 16·6 per thousand. It varied considerably according to locality. In some parts of England, where health was the main object considered, it had been as low as 9 per thousand; in others, where the chief objects were manufacture, trade, or money-making, it had been 30 per thousand. The death-rate was susceptible of considerable modification, and we knew how it might be increased or diminished; it behoved the nation to exert its power and stand credited with the lowest figure. In fact, it was, within certain limits, at our own control, and whether the people should die at the rate of 13 or 23 per thousand depended on how we recognised our responsibility and put in force sanitary regulations. It was mainly a question of finance. Our sanitarians could say how it was to be done, and were perpetually saying it, but more money, more faith, more energy were needed to deal with this question satisfactorily. From a comparison of the tables of 1841 and 1881-90, it was seen that the mean expectation of life had increased both for males and females up to the age of thirty, but diminished after that age, showing that though improved sanitation saved more children's lives, the conditions of life being harder as time progressed, the expectation of adult life had become rather less; for the very causes which enabled the weak and sickly to survive had perhaps in the end thus tended to diminish the value of the adult life of such survivors.

The President also referred to the beneficial results of sanitary work in India during the last half century, and, in concluding his address, he said it could not be doubted that the Sanitary Institute had already done excellent work, and had contributed its share to the advance which public health had made since its foundation. The Spirit of Hygeia was abroad, and measures for preserving health and preventing disease, which at no very distant period in the past were looked on as mere hypotheses, were now, notwithstanding the obstacles to research arising out of ill-considered sentimental opposition, regarded as of vital importance, and an integral part of the basis of the system of administration on which the public health depended.

On the motion of Earl Beauchamp, Chairman of the Health Committee, Worcester, seconded by Councillor Martineau, a vote of thanks was accorded to the President for the address.

The President having replied, the meeting terminated.

In the evening the Lord Mayor opened the Health Exhibition at Bingley Hall.

Conference of Municipal Engineers.

On Wednesday the five conferences were commenced at Mason University College. The Municipal and County Engineers met in the Physics Lecture Theatre, and the President (Mr. T. de Courcy Meade) opened the proceedings by reading an address. He referred to some Manchester matters to which he is at present giving special consideration, commencing with the housing of the working classes. The difficulties, he said, of providing sufficient suitable accommodation at reasonable cost for persons of the working class displaced from insanitary areas, or from areas cleared for street improvements and railway works, were in most instances very great, and were greatly enhanced by the tendency to overcrowd, which, in many cases, unduly increased the number of persons to be provided for upon areas already too limited. These difficulties had been met in Manchester by the erection, on the cleared sites, of *(a)* blocks of five-storied tenements approached by a common stairs and balconies, *(b)* blocks of tenements of two and three stories, with separate entrance and stairs to each set of tenements, *(c)* terrace cottages of five rooms each, *(d)* a model lodging house. The Manchester Corporation were also erecting *(e)* cottage dwellings in the outskirts of the city, about two and a half miles from the cleared areas, where land was less costly; these cottages varied somewhat in character and contained from five to seven rooms each. The buildings class *(a)* had been occupied about three years, and were let at rents which yield a moderate return upon the cost of erection. The two blocks *(a)* of five-storied buildings cost about 87,000*l.*, exclusive of the cost of sites. The latter with old buildings thereon cost about 54,000*l.* Single-room tenements were let at 2s. 6d. per week, the rent of two or three roomed tenements varies from 3s. to 5s. per week. In addition to the above-mentioned new buildings, much had been done in the improvement of existing dwellings, and the conversion of "back-to-back" houses into "through" houses. This work, though excellent where it was effected, had a tendency to cause overcrowding elsewhere, as the number of persons that could be accommodated in the converted and improved dwellings was much less than was crowded into the "back-to-back" houses before alteration. In all cases the groups of pail closets used by the occupiers of one or more blocks of houses were removed, and that each "through" house was provided with a proper water-closet. The substitution of private water-closets for common pail-closets and privies was thus gradually proceeding, but would doubtless be a work of time. There were at present in the City of Manchester 76,913 pail-closets 22,990 privies, and 13,014 middens; but these numbers were annually becoming less, as water-closets were being provided wherever alterations to property were effected by the Corporation.

The President then gave a few particulars of the cost, &c., of sewage treatment at the Manchester outfall works.

On the motion of Mr. E. G. Mawbey, Leicester, seconded by Mr. Yabbicom, Bristol, a vote of thanks was accorded to the President for his address.

By-laws Relating to New Streets and Buildings.

Mr. J. S. Pickering, Nuneaton, then read a paper entitled "By-laws Relating to New Streets and Buildings."

It is scarcely possible within the limits of short paper to make any detailed reference to by-laws affecting new streets and buildings. It is more with a view to elicit an expression of opinion on the subject generally that it is introduced. It is proposed to refer more particularly to by-laws made in England under the provisions of the Public Health Acts rather than to by-laws made under local Acts, but the author's remarks will apply in some measure to by-laws with reference to sanitary matters in general.

The Public Health Act, 1875, empowers Sanitary Authorities to make by-laws with respect to new streets and buildings, and repeals previous Acts under which such by-laws were made. But it provides that by-laws made under these repealed Acts are to be deemed by-laws under the Act of 1875 if not inconsistent with the provisions of such Act.

In 1877 the Local Government Board drew up a "Model" series of by-laws for the guidance of Local Authorities. These have been somewhat amended from time to time, and have been framed with great care and under the best legal advice. What is also of the utmost importance, their provisions are considered to be in accordance with the statutory enactments by which they are authorised. But notwithstanding these conditions the "Model" by-laws have not been received with general approval.

It is true that by-laws made since the passing of the 1875 Act generally adhere closely—and in the greater number of cases almost word for word—to the "Model" series, but this is not so much on account of their general suitability to the districts for which they are adopted as to the fact that the Local Government Board will not sanction any important departure from their "Model" code. The result is that many authorities do not possess any by-laws at all, others depend upon by-laws of doubtful validity made under former Sanitary Acts, while the great majority do not enforce the particular by-laws they have been compelled to include in adopting the "Model" series.

It is somewhat astonishing that this state of affairs should be allowed to continue with the extension of local government which has taken place in the country, and when there is a general desire on the part of Local Authorities to carry out the provisions of the Sanitary Acts.

The varying circumstances of different districts make it impossible to frame a series of by-laws applicable to all. By-laws, for instance, affecting new streets and buildings in large towns would be altogether unsuited to the requirements of, say, the villages of rural districts. But obvious as this is, it is a matter which is overlooked, and accounts for the absence of by-laws in many rural sanitary districts.

Section 157 of the Public Health Act, 1875, provides that every Urban Authority *may* make by-laws with respect to the following matters: the level, width, and construction of new streets, and the provision for the sewerage thereof; the structure of walls, foundations, roofs and chimneys of new buildings for securing stability, and the prevention of fires, and for the purposes of health; the sufficiency of the space about buildings to secure a free circulation of air, the ventilation and drainage of buildings, and the closing of buildings unfit for habitation.

Surely these provisions are of sufficient importance to make their adoption imperative. Possibly twenty-three years ago when the Act came into force it would not have been desirable to make the adoption of by-laws compulsory, but considering the advance of sanitary science since 1875 and the general determination of the community to live in greater comfort, and consequently under healthier conditions, there now appears to be no valid reason against the adoption of proper by-laws in every sanitary area. It is evident that the Legislature do not accept this view, or they would not continue to make the adoption of important sanitary measures permissive on the part of Local Authorities.

The Public Health Acts Amendment Act, 1890, contains many important provisions affecting the health of the community, but they cannot be put into force without months of delay in complying with the wearisome details provided for in the adoption of the Act. Section 23 of this Act gives to Sanitary Authorities increased powers as to making by-laws affecting new streets and buildings. Under this section a by-law may be made with reference to the height of bedrooms and other rooms used for human habitation. It seems almost incredible that until the passing of the 1890 Act, Sanitary Authorities had no control over the height of such rooms, although many authorities possessed a by-law fixing their minimum height. This was one of many by-laws inconsistent with the provisions of the Public Health Act, 1875, and therefore *ultra vires*, but it has been carried out as though it possessed full legal force.

In many of the larger towns by-laws made under the Public Health Act, 1848, the Local Government Act, 1858, and other Acts repealed by the Public Health Act, 1875, have not been amended, though repugnant to the laws of the country, and the Authorities possessing them prefer to retain these, trusting to their legality not being questioned rather than adopt the more modern by-laws as sanctioned by the Local Government Board. This position on the part of the Local Authorities should scarcely be possible; in any case it should not be a necessary position to take up in order to secure by-laws adapted for the health and convenience of a district, for it must not be overlooked that many of these ancient by-laws, as in the case of the one referred to, are eminently desirable, whatever may be said of their validity from a legal point of view.

By-laws made under Acts previous to the Public Health Act, 1875, are, as a rule, so conveniently elastic that this is another reason given for their retention in preference to the rigid by-laws of the present day. The following are specimens of the by-laws in force in a town with a population of upwards of 130,000:—

> "The walls of every new building shall be constructed of such thickness as shall be approved by the said Council."
>
> "The owner or occupier of every house shall provide proper ventilation in the drainage thereof by means of the rain-water pipe from the roof of the house, or by such other method as the said Council shall direct."

These are a striking contrast to the detailed by-laws referring to the thickness of walls and the ventilation of drains in the "Model" series, and yet they are only examples of similar by-laws in force in numerous large towns.

Another convenient old by-law is one giving the Authority discretionary power with respect to the enforcement of air space at the rear of buildings. The Local Government Board will not now sanction a new by-law which provides for this discretionary power. But most Sanitary Authorities, nevertheless, do not hesitate to exercise their discretion when an occasion arises, such for instance as in the pulling down and re-erection of a building where the provision of the by-law cannot be adhered to without considerable sacrifice of property. It may, of course, be contended that the air space is necessary for the health of the occupants of a dwelling wherever the building is situated, and more especially in a populous district where property as a rule is the most valuable. But an Authority has often either to allow a building to be re-erected (and possibly improved from a sanitary point of view) without the requisite air space, or submit to it being altered in such a way that it will not come within the scope of the by-laws as a new building. Discretion in a case of this description seems desirable, but it must be admitted that any general admission of discretionary power in the by-laws would probably result in frequent acts of indiscretion on the part of some Authorities.

By-laws of the "Model" series relating to the thickness of walls are seldom carried out in their entirety, especially where they have been adopted in the smaller towns and rural districts, where there is often a feeling that their enforcement may prejudicially affect the desirable growth of the district. So far as by-laws can be prepared to meet the varying conditions affecting the thickness of the walls of a building, the "Model" by-laws do not appear to leave much to be desired. Possibly the thickness prescribed for the walls of small houses up to three stories might be somewhat modified to meet the objections usually raised against them in the smaller districts; but there will always be a difference of opinion as to what should be regarded as the reasonable and necessary strength of a building, and much will, of course, depend upon the quality of the material and workmanship.

(*Continued on page* 293.)

Illustrations.

LANERCOST PRIORY.

It may be objected that Lanercost, being a Priory, ought not to come into a series of the "Abbeys of Great Britain"; but from an architectural point of view this is really only a question of nomenclature. A Priory is but a small Abbey, dependent on a larger one; the interest of the buildings is the same; and the church at Lanercost, which in this as in other cases is the main object of our illustration, is in better preservation than many of the Abbey churches.

Like many of the Augustine Abbeys, we find Lanercost beautifully situated in a valley, in a commanding position on the north bank of the River Irthing. It stands so accurately in the line of the Roman stations on the wall that it has been conjectured to be the site of Petriana, one of the missing Roman stations.

Turning for a moment to a few incidents in the history of the Monastery, it is recorded that when William the Conqueror parcelled out England among his followers he bestowed the whole county of Cumberland upon Ranulph de Meschines, the husband of his niece, and appointed him Earl of Carlisle or Cumberland. The Earl thus enriched and appointed, in accordance with the feudal tenures then customary, divided out his earldom into eleven baronies, one of which—the barony of Gilsland—he gave to one Hubert de Vallibus or Vaux, a relative of his, who took his name of Vallibus from the Roman wall, which ran through his new possessions. Some time after this, the Scots raided the district, and, after turning out the Norman grantees, laid it waste. Henry II. recaptured Cumberland from the Scots, and by deed regranted and confirmed the Barony of Gilsland on Hubert de Vallibus, then an extremely old man. He was shortly succeeded by his son, Robert, "a valorous gentleman and well learned in the law of the land." He it was who founded the monastery at Lanercost to commemorate the souls of his father and mother.

Robert de Vallibus, the founder, died without issue, in 1199 or 1200, and through succeeding members of his family the property passed to the Multons, who were great benefactors to the Priory. From Margaret Multon, the heiress of De Vallibus, it passed to her granddaughter, who eloped at the age of seventeen from Warwick Castle with Ranulph Dacre in the year 1317. By their marriage the Gilsland estates came to the Dacres. The lands of the Vaux continued in the hands of the Dacres until the year 1569, when the family ended in three co-heiresses, by one of whom, "Bessie of the braid apron," they passed to "Belted Will Howard," the famous Lord Warden of the Marches.

In the year 1280, according to the chronicle of Lanercost, Edward I. and Eleanor, his queen, came to Lanercost, and the Prior and convent met them at the gate. The King presented a silk cloth to the Priory on this occasion, he also hunted in the Inglewood Forest, and took "two hundred stags and hinds."

In the April of 1296 the Scottish army, according to the chronicle, of 500 horse and 14,000 men, under the Earl of Buchan, marched on Carlisle, but being unsuccessful there, laid the surrounding country waste, with terrible barbarity, Lanercost and Hexham suffering severely, when in the midst of their destructive work at Lanercost news arrived to them that the King of England was close at hand with a large army, and so the Scots set off back, laden with their booty, after having burnt some of the Conventual buildings, but not the church.

The year following William Wallace ravaged the place again.

Some ten years later, in 1306, King Edward I. was too ill to head his own army in person against the Bruce, but travelled by stages to the Scottish marches in a litter carried by horses, and arrived at Lanercost Priory on Michaelmas-day, staying until Easter in the following year. Many important documents and writs were dated from Lanercost, including the one which banished for ever Piers Gaveston from the kingdom.

Again in 1311, headed by Robert the Bruce, the Scots visited the place and imprisoned most of the Canons. These Scottish raids caused the priory much harm and loss of income.

The luckless Priory had not yet done with Scottish invasions, for in 1346 David, King of Scotland, with his army visited it and was received by the Canons, whereupon "the sacred vessels were thrown out, treasures were stolen, doors were smashed and reduced into nothingness everything attacked by them. Lanercost after this relapsed into obscurity, and never again raised its head.

A most important document in the form of a letter from Archbishop Bowet of York to his suffragan bishops is dated York, April 18, 1409, in which the Archbishop says that he has turned his attention to the poor canons, prior, and convent of Lanercost, whose monastery and most of its buildings, "as the prior with lamentable voice tells us," are threatened with ruin; their buildings and possessions, in consequence of frequent attacks from the Scots, are in ruins and burnt; their lands from the same reason lie uncultivated; in short, that the prior and convent are reduced to such poverty that they cannot nowadays live without the help of other Christians, nor serve God according to the rules of their duty. The Archbishop, who was a Black Canon himself, requests his bishops, when deputations from the Priory arrive to collect the money, to receive them well, to explain their errand thoroughly by means of the parish priest in each church, and to let them have the money collected without any deduction, and further grants subscribers to the restoration fund an indulgence of forty days. This letter is curious; it proves the antiquity of circular letters from a bishop directing collections to be made in the churches of his diocese for some object approved of by him, and it also hints that tolls were sometimes taken off the collections.

In 1536 was passed the Act for doing away with small monasteries, and in that year the Royal Commissioners began their visitation of northern monasteries at Hexham, where they met with armed resistance, which like a flame kindled up a rebellion all through the North of England.

The Prior of Hexham is said to have been "tied up" over his own gate; he of Lanercost, John Robinson by name, had better luck, and appears to have been made rector to a neighbouring parish over which the Priory had some rights.

The Convent thus rudely disestablished and disendowed, was of the order of Austin or Black Canons, belonging to a similar order as that at St. Mary's Priory, Carlisle, and St. Andrew's at Hexham.

After the dissolution, Henry VIII., by letters patent dated November 22, in the thirty-fourth year of his reign, granted to Thomas Dacre, the bastard, of Lanercost, in consideration of his truth and faithful services, the house and site of the late monastery and other property, rendering for the same to the King 9s. yearly.

This Thomas Dacre, in the year 1559, converted some of the Priory buildings into a dwelling-house. The last Dacre of Lanercost died without male issue, and the site of the Priory and lands reverted to the Crown, it being leased and finally purchased in recent years by the Earls of Carlilse.

Before the buildings were restored they were allowed to fall into utter ruin, the vaults were open, and, according to some writers, the corpses were exposed to view.

The income of the Priory at its dissolution was but £77. 11s. 11d. per annum.

On entering by the ancient round-headed gateway, whose ruins still form a picturesque feature in the landscape, we see before us the noble west front of the Priory, the lawn in front of it still retaining its character.

Examining the plan and general arrangements of the buildings we find the Priory consisted of a cruciform church, the transepts with eastern aisles, the chancel with aisles on both sides. The nave, as at Bolton Abbey and Brinkburn Priory, had no aisle on the south side. On the south side of the church were placed the conventual buildings, with the prior's lodge at the south-west corner, an arrangement usually found in priories of this order, as at Carlisle and Hexham.

At the west end of the church and conventual buildings stands an old border tower, pointed out as the tower in which Edward I. resided during his visit to Lanercost, which had possibly an outer court connecting it with the Priory. To the west of this stood the gatehouse, with porter's lodge, and remains extending from the gatehouse indicate the position of the stables, barn, and buildings connected with their farming operations.

Portions of the boundary wall surrounding the monastery are still standing.

Taking a general view of the interesting architectural features of the buildings now remaining, the conclusion is forced upon our minds that there is a gradual progression of style in the buildings, as if the monks had improved in their designs as they proceeded. This gradual increase of ornamentation appears to have commenced with the choir and to have proceeded, with occasional breaks, westwards, finishing with the west front. One does not here find an aisle added at one time or a transept at another, but a gradual progression of style, commencing from the very Early Transitional door on the south side and moving round the east end of the building to glide gradually through the very Early English to the perfected Early English west front; the difference being about seventy or eighty years. The probability is that the buildings took that time to fully complete, that at the consecration in the year 1169 only a small or temporary portion of the priory was built. We may conjecture that great part, if not all, of the original erection was at the time of the consecration built of wood. As the community grew more wealthy, they in part rebuilt and greatly added to their original building, availing themselves of every new development of style.

The greater portions of the buildings now remaining are of thirteenth century work. Examination, however, shows that a comprehensive plan had been made at the first, which was carried out as funds and time permitted, for we find the Early Transitional base course, extending along the south wall of the church, round the south transept as far as the chancel aisle, where it terminates.

The lower portion of the south transept walls and south side of nave, with the flat pilaster-like buttresses springing from the base course, are also of Transitional work.

These walls contain three fine doorways, simple in detail, but bold in character, one of them being an early specimen of the Pointed arch. All have detached shafts, with capitals of simple design.

The Conventual buildings on the east of the cloister-garth were also of this date, as is indicated by the return of the early base course in that direction; the Early Transition doorway, inserted at the end of the north aisle and transept, may probably have been the doorway leading to the cemetery, or perhaps the Chapter House. The masonry of this early work differs in its uniformity from that of the later portion of the buildings, and is of grey freestone, each stone dressed and squared, and of unmistakable Roman character, most likely obtained from the Roman wall. The Transitional work is carried up to the string course of the nave, after that the work changes. After the year 1250 the Priory was considerably enriched, and it must have been one of the most flourishing periods of its history, the energy of the monks being concentrated on the building of the choir and eastern portion of the church, completing the cloister, the south and west sides being of this date. Prosperity still gleaming on the monastery, the nave from the choir westwards was completed.

We can see the change most marked in the clearstory, where from groups of Transitional boldness and simplicity it changes, keeping the same proportions and contour, to the more delicate mouldings of the Early English—with here and there a foliated capital, whose rareness adds to the beauty and charm of the work. In one place we find a nail-head, and further on in same arcading of the clearstory we have the perfect dog-tooth ornament. In the later work much red sandstone appears, and the dressed work of all the late additions is of red sandstone. The choir, viewed from the nave before the erection of the modern east window, would be a feature of great dignity.

The nave has only one aisle, the transepts vary, but variety is most marked in the choir, where on the north side there is a groined aisle which gives us the three stages of triforium and clearstory, and on the south an aisle with open timbered roof, lofty arches, and no triforium—a difference evidently intended by the original design.

The capitals of the west doorway vary on each side. Foliage carving has been very sparingly used, but where it appears it is with beautiful effect.

The composition of the west front is very good; the bold projecting base course, the finely recessed doorway of five orders, well proportioned mouldings, the arcaded gallery above it, and the seven lancets alternately pierced, make an imposing west front.

Beyond the rood we enter the choir with its chapels, a well-designed original piscina remains in the north-east chapel, in the north chancel aisle is an aumbrie, as also in the east wall of the choir and remains of the piscina and double sedilia are visible in the south wall. Remains of the steps of the choir still exist, also of the steps to the chapels.

The windows on the north and south sides of the high altar have been widened, that on the north side being filled with Perpendicular tracery, the Dacre badge, the escalop shell, appearing over it. The chapel on the south side of the chancel was restored and re-roofed by the Dacres, judging from the fact that their badge appears on the corbels supporting the roof timbers; the windows may have been inserted by Thomas Lord Baron Dacre of Gilsland. He commanded at Flodden Field and died in 1526. His fine altar tomb stands in the archway between the south chapel and the choir, carved over with the arms of all the various baronies.

By the door in the west wall of the south transept we enter the cloister-garth, and on the north side of this doorway is the stoup. No traces of the ambulatory remain except the corbels for supporting the timbers of the roof. On the east side of the cloister, and adjoining the south transept, was probably the slype, leading to the Canon's cemetery, and beyond would be the Chapter House, with its vestibule, and then the staircases leading to the dormitories, which apparently were not cellared under, but which would be raised above the ground level. On the south side of the cloister-garth is a range of early cellarage with two doorways to it from the cloisters, and one from it to an outer yard. The west side is also occupied with early cellarage, and probably used as storehouses and stables. At the southern end there is a charming specimen of a simple groined apartment, with plain chamfered ribs, springing from moulded corbels, each corbel slightly differing.

Beyond was the Prior's Lodge, and over this cellarage was probably the parlour and library, and a hall for entertaining guests. This portion was afterwards converted by the Dacres into a dwelling-house. To the west of these, as already mentioned, is a tower, which possibly had an outer court. This tower would be used as a means of defence or refuge, also as a lodging for guests of distinction. On the west side of the tower we see remains of early work, so that in all probability there was an outer court fitted with the various offices necessary at that time. On the east of the Prior's Lodge, remains of a wall enclosing a small kitchen yard may be traced.

A few years later than the date fixed as the zenith of the Priory's prosperity, misfortunes commenced; in 1291 the Scotch came and burnt the conventual buildings, but not the church; and again in 1296-7 they mutilated and plundered the place. We may conclude that the western portion of the cellarage adjoining the Prior's Lodge was destroyed in the burning, and rebuilt in the later style about the time of Edward I's. second visit in 1307. We find that the groining, shafts, and ribs appear to be new, very probably the Prior's lodge was also burnt and not rebuilt. History has little more to tell; but on examining the building we find traces of King David's visit, and the subsequent repairs. It seems probable that at his visit, most of the buildings with wooden roofs were destroyed by fire, the nave roof, the roof over the south chancel aisle, and the roof of the choir perished in the conflagration; that the central tower was mutilated, and the buildings on the west of the cloister were reduced to ruins, as they bear signs of two or three rebuildings.

The upper portion of the tower was rebuilt in the Perpendicular style and finished in the interior with a flat wooden roof, the interior walls being built with an inclination upwards to receive it. When the monastery came into possession of the Dacres in 1539 the buildings on the west side of the cloister were converted into a dwelling house, as we ascertain from an inscription in the east window of the church, originally in the banqueting hall.* The alterations were commenced by the first Knight, Sir Thomas Dacre, and carried on by his successor Sir Christopher Dacre; the inserted fireplace in the hall bearing his initials C.D., 1586. The various rooms forming the west front of the cloister were thrown into a large hall and new windows inserted; the fireplaces appear originally to have been on the west side of the hall and to have been done away with, a large open fireplace being inserted in the centre of the east wall. The north end seems to have been the daïs end, and a small chamber beyond still retains portions of the oak panelling and a plaster frieze and cornice, in which at regular intervals are introduced the arms of the Dacres. A small staircase in the thickness of the wall at the south-west corner gives access to the solar above this room, both rooms having small windows looking into the church. The hall would be about 100 ft. long, and only about 18 ft. at its narrowest end. A portion of the decoration can yet be traced. The south end of the hall seems to have had rooms over it, a circular staircase common to it and the tower giving access to the rooms.

The first floor of the Prior's lodge was evidently made into a kitchen and scullery, the fireplaces and brick ovens still remaining; the adjoining room partly under the great hall seems to have been rebuilt, and had later the larger windows with stone benches inserted at the west end; this portion was divided by a wall from the earlier cellarage and was about 12 in. below their level. At the north-west angle of it there is a curious little closet with steps up to the outer court, which probably may have been a porch. A doorway was made from the great hall into what was formerly the refectory, and then probably used as a large dormitory for servants.

The following extract will give some clue as to what became of the fittings of the church after the Dissolution; it is copied from an account of "Belted Will's" chapel in Naworth Castle:—

"The chapel or oratory was situated near the library, at the top of the tower, and contained several interesting remains. It was fitted up with plain wainscot, painted red, and ornamented with escalop shells and cross crosslets, armorial devices of the Dacres and Howards. There were also fragments of what is supposed to have been the rich screen of the rood-loft or part of the reredos of the altar of Lanercost Priory Church, consisting of carved ornaments, of pierced work richly painted and gilt, nailed up on the walls of the apartment. On the altar were several figures in white marble, about a foot in height, sculptured in alto-relievo, and which were of considerable value. They represented the descent of the Holy Spirit, an abbess holding a sword attending a crowned personage falling on a sword, St. George and the Dragon, Judas saluting his Master with a kiss, St. Cuthbert carrying the head of St. Oswald, &c. It is probable that they were brought from the adjacent monastery of Lanercost at its dissolution. Above the altar was a large painting on wood, 12 ft. in width by 3 ft. 8 in., representing the Passion of Our Lord."* From this it would appear that the Priory had been fitted up with some splendour.

Some few years ago the nave and buildings on the west side were carefully restored by Mr. Charles J. Ferguson, F.S.A., to whom I am indebted for much of this information and for the use of his plan.

E. RIDSDALE TATE.

* Dr. Todd's MSS.

* "Lanercost Priory," R. S. Ferguson, M.A., and C. J. Ferguson, F.S.A.

STALLS: ABERDEEN AND DUNBLANE.

KING'S COLLEGE CHAPEL, ABERDEEN.

THE stalls in the chapel of King's College, as many of our readers are aware, are of exceptional richness and interest, and represent moreover a type of work rather different from what we generally meet with in choir-stall work in Great Britain.

The work dates from the beginning of the sixteenth century, and the tradition is that it was executed for the most part by a French artist—a tradition quite in keeping with what we know in regard to the close social and political connexion formerly existing between France and Scotland, though the carving below the plain panels is very probably by a local man.

Mr. Fulton's drawings show the general elevation and plan of the work, on the large sheet, and one of the smaller plates shows some of the upper panels to a larger scale. The panels are all of different design, and show a great deal of variety combined with a sufficiently uniform effect when the work is considered as a whole. In some of them the details are based on floral forms—thistle, vine, oak, &c., while the conventional French fleur-de-lis is also introduced.

DUNBLANE CATHEDRAL.

The stalls at Dunblane, which, like those at Aberdeen, are carved in oak, and are probably of about the same or of a slightly later date, are not equal in delicacy or in special interest of style to those at King's College, Aberdeen; but they represent the characteristics of Scotch woodwork, and are probably native and not foreign work. The introduction of the centaurs indicates Renaissance influence, the foliage carving is a rather curious mixture of late Gothic and Classic forms, such as one finds elsewhere in Scotch carved work of this period.

The drawings form part of those for which their author, Mr. Jas. B. Fulton, was awarded the Aldwinckle Prize at the Institute of Architects, early in the present year.

THE SANITARY INSTITUTE CONGRESS' BIRMINGHAM.

(Continued from page 291.)

As the powers and privileges to make (and necessarily to enforce) by-laws under the Sanitary Acts have not been so fully appreciated as the framers of the Acts must have anticipated, it is a question as to the proper course to be adopted to bring about a better state of things. That it is desirable for all Sanitary Authorities to have proper by-laws affecting new streets and buildings there can be no doubt. However seldom it may be necessary to bring such by-laws into operation they will be of service at some time or other, even in the most sparsely populated districts. If, then, suitable by-laws are essential in rural districts, how much more important that populous towns should possess by-laws framed with the highest possible considerations for health and convenience. This, in the author's opinion, will only be brought about by the adoption of by-laws being made compulsory and a greater latitude being given to Sanitary Authorities to frame by-laws adapted to their own particular districts.

But the possession and value of by-laws will be of little effect if the necessary means are not adopted for enforcing them. Even in districts where there is an apparent desire to see the by-laws strictly carried out, the Surveyor's staff is generally so inadequate that the necessary amount of supervision cannot be given. In the author's opinion no new house should be occupied without a certificate from the Surveyor that it has been erected in accordance with the by-laws, and is fit for human habitation. But it would be manifestly unfair to expect a Surveyor to give such certificate unless he had satisfied himself by systematic and regular supervision on the part of a competent staff during building operations that such certificate was justified. Then again, such a certificate could not be given where the by-laws were not enforced. In some of the older by-laws this certificate is required to be given, but it is not probable that a by-law would now be sanctioned to this effect. Indeed, it would scarcely be desirable until the necessity for a better supervision of new buildings is recognised by Sanitary Authorities.

It appears to the author that many provisions contained in by-laws might with advantage be incorporated in the Sanitary Acts, making them statutory enactments rather than measures to be adopted at the option of Local Authorities. It also seems desirable that by-laws should be made less comprehensive, many matters of detail now included being made the subject of regulations varying according to the requirements of each particular district. Under these conditions a general series of by-laws more acceptable than the present "Model" series could probably be framed, and Sanitary Authorities would be able to include in their regulations many important matters which would make by-laws cumbersome and unnecessarily lengthy. In the case of new streets, for instance, the by-laws might very properly lay down the requirements as to widths under various conditions, but the actual method of construction would be better dealt with in detailed regulations, forming a practical specification of the requirements. Then again, matters connected with the drainage of a building could be more conveniently and in greater detail referred to in regulations. It would add to the value of such regulations to accompany them with a complete set of descriptive drawings.

Many Authorities supplement their by-laws

with regulations as to drainage and other matters, but as these are not confirmed by the Local Government Board, and very frequently contain conditions which could not be legally enforced, they cannot be said to be wholly satisfactory.

In any revision of the "Model" by-laws and the Acts under which they are framed, the author is of opinion that the Incorporated Association of Municipal and County Engineers might afford most valuable assistance. Throughout the Sanitary Acts and the "Model" series of by-laws, there are many technical defects which the municipal Surveyor could very readily rectify and thus put an end to much unnecessary litigation. The Local Government Board in 1877 acknowledged the assistance rendered by the Royal Institute of British Architects in framing the by-laws dealing with new streets and buildings, and they would no doubt equally value the help of a professional body whose members must by their every-day experience possess a most intimate knowledge of the subject.

It is to be hoped that the time is not far distant when every Sanitary Authority in the country will be in possession of by-laws which it will be deemed a duty to carry out in the interests of the health of the community.

Mr. Price, Birmingham, proposed a vote of thanks to the reader of the paper, and Mr. Longden, Warrington, seconded. The discussion was continued by Messrs. Eayrs, Birmingham; Caink, Worcester; Hunt, Dorchester; Read, Gloucester; and Price, Worcester. In the course of his remarks, Mr. Eayrs said that there were many Local Authorities throughout the country who were afraid to adopt new by-laws because the Local Government Board insisted upon the model by-laws being carried out with very little modification. The Local Authorities thought that some discretionary powers should be left to them.

The vote of thanks having been agreed to, and Mr. Pickering having replied to some of the points raised in the discussion,

Mr. T. J. Moss Flower, of Bristol, read a paper entitled,

"*Precautions to be Observed in the Ventilation of Sewers and Drains.*"

In the course of the paper the author said that the object aimed at in ventilating sewers was to prevent, as far as possible, the evolution of gases; to carry harmlessly from the sewers the gases that could not, owing to the physical conditions that existed in sewers, be prevented; to prevent such an abnormal increase in the pressure of the sewer air or gas within the sewer as would make the possibility of the water seal of the traps fixed in connexion with drains discharging into the sewers becoming broken, within reasonable bounds, or cause the sewer air to be forced out at defective or inconvenient points in the sewers or drains, and to purify the air of sewers sufficiently to enable men to work in them. He came from one of the greatest cities in the United Kingdom, where no special means were provided for ventilating the sewers. The objects aimed at in the ventilation of house drains were, to a large extent, the same as in the case of sewers. By properly ventilating the drains the traps connected with the various sanitary fittings were relieved from undue pressure caused by the discharge of water-closets, and other fittings were thus assisted in maintaining their water seal; and should any gases from the public sewer by any means pass to the house drain beyond the disconnecting trap they would be carried harmlessly away instead of remaining stagnant in the house drain to pour, perhaps, into the house through some defect which might at any time occur. Having referred to the injurious effect of sewer air upon health, and considered the bearing of the law on the subject of the ventilation of sewers, the author dealt with the plan most generally adopted in ventilating sewers and drains and some of the precautions to be observed in connexion therewith. The law on the subject was very vague and somewhat difficult of application and required modification. After the model by-laws had been revised, it should be made compulsory for every Local Authority throughout the country to adopt them and to insist upon their being enforced. As to the precautions to be observed in providing for the ventilation of sewers and drains, if success were to be attained, it was useless to consider the question of ventilation apart from the question of the construction and maintenance of the sewers and drains, and the size of the sewer compared with the work it had or might have to do. Sewers should be capable of removing all the foul matter sent into them to its ultimate place of deposit before decomposition set in, and with good falls, plenty of flushing and proper attention, this object could be attained, and unless this could be done, a nuisance must arise from the sewage.

We print the following conclusions from the author's paper: (1) Sewers of deposit should be reconstructed if it is desired to remove complaints. (2) Surface gratings should not be fixed in narrow streets. (3) In fixing shafts up the sides of houses they should be fixed to the tallest buildings; high factories and churches and chapels might well be used for fixing the shafts to, and the gases delivering at a high altitude could not do any harm. The law should allow of Local Authorities fixing sewer-vents to the houses. (4) The shafts to be carried well above the ridge of the roof, and in no case should a pipe be fixed to a house unless at its highest point it could be fixed clear of all doors and windows. This applies to drains. (5) The shafts to be not less than 5 in. or 6 in. in diameter, and to be surmounted with a cowl to prevent down blows. (6) The pipe at foot to be provided with a duck's-foot bend, with well at bottom for the reception of the rust, a cleaning-out hole being provided so that any obstruction could be removed. (7) The dead-end of all sewers to be ventilated by a 6 in. to 9 in. shaft fixed clear of all windows. (8) The sewers cut up in sections, so as to prevent the gases from the lower districts getting to the sewers in the higher part of the town. (9) To see that in the event of open gratings being used, they shall not be placed near the pavement or near the entrance to dwellings. (10) To pay constant attention to the ventilating appliances to see that they are kept in working order.

With regard to drains, it is desirable to see (1) that the drain from end to end is properly ventilated, and not, as in the majority of cases in detached and semi-detached villas, by ventilating the soil pipe, which is usually connected about the centre of the drain longitudinally, and fixing a 4-in. pipe on the inlet side of the disconnecting chamber in front of the house, and fixing in front of the 4-in. pipe a piece of freestone with four or five small holes in it, leaving that part of the drain from the foot of the soil-pipe to the back of the house unventilated. (2) To dispense with the use of mica flap-valves, and if a site for a low-level inlet pipe, clear from all doors and windows or places much frequented, could be found, to run the inlet shaft from the drain site of the trap to the ridge of the roof, as it seems simply ridiculous to carefully make all the pipes sound and leave a free opening for the discharge of the drain air in front of the larder or drawing-room window, as is so often found. (3) To arrange the vent-pipes so that the outlets shall not only be clear of the windows, doors and other openings in the house to which the pipe belongs, but also clear of all openings to other houses. This object is seldom kept in view, and much inconvenience and ill-health is believed to be caused by the foul air from neighbours' shafts. The Local Government By-laws bearing on the subject are very vague, and permit inlets at as near the ground level and outlets as low as 10 ft., and where builders and owners are determined to defy Local Authorities there is very considerable difficulty in getting them to carry out the ventilating arrangements in a proper manner. They use for the most part the very cheapest kind of material for ventilating pipes and simply make their joints with a little red lead or something of the sort; the pipes generally are barely carried above the eaves, and every precaution should be taken to prevent this class of work being done. All this could be prevented by the adoption of by-laws specifying in greater detail how the house drains should be ventilated, giving particulars as to the kind of pipe, the joints, &c. (4) To see that in exposed positions at least a cowl to prevent down blows should be fixed at the top of soil pipe ventilators. This the author has found to be absolutely necessary after taking observations over a period of four years in exposed positions. He has found that the water seals in the traps of water-closets become destroyed by the wind blowing down the soil-pipe ventilators with wire globes at their tops. As in the case of sewers the construction of the drainage plays a most important part in the successful ventilation of drains. The drains must have good falls, be constructed of proper materials, be well flushed. The disconnecting trap should be of self-cleansing nature, although in the absence of special flushing arrangements it cannot be expected that the trap can be properly cleaned with the appliances generally in use.

A paper, entitled "Some Sanitary and Allied Advantages Attending the Introduction and Use of Motor Vehicles," was then read by Mr. E. Shrapnell Smith, who, in conclusion, proposed the following motion:—

"That this Conference of Municipal Engineers assembled in connexion with the Congress of the Sanitary Institute, this 28th day of September, 1898, is of opinion that the introduction and use of efficient motor vehicles should be encouraged by Municipal, Urban, and other authorities, in view of the fact that the extended use of such vehicles would contribute to the general improvement of the sanitary condition of streets and towns, and this meeting recommends the Council of the Sanitary Institute to make known this opinion as widely as possible."

A discussion followed, the following gentlemen taking part therein:—Messrs. Price, Eayrs, Williams, Hooley (Notts.), Phillips (Gloucester), Glover (Warwick), and Mawbey. The motion having been agreed to, a vote of thanks was accorded to the readers of the two papers, and the meeting terminated. In the afternoon visits were made to various public works in course of construction in or near the city.

Conference of Sanitary Inspectors.

The Conference of the Sanitary Inspectors was held in the Biology Lecture Theatre, Mason University College. The President (Mr. W. W. West, of Walthamstow), in the course of his address, said that the year 1848, with its Public Health Act, was a landmark in English history, and he proposed to consider the inspector's share in the past and future of sanitation. In the year 1846 the nauseous effluvia emitted from the sewers was of sufficient urgency to engage the attention of the Royal Institute of British Architects, and at one of their meetings in that year Mr. Toynbee opened a discussion thereon, and suggested the use of gas-burners in tall shafts for the purpose of getting rid of the trouble. Still, we had the trouble with us, forming one of the most constant sources of anxiety to those engaged in managing our sewers, and the settlement of which we did not appear to be within sight of. There was no denying that in these and similar directions we had not made the advance that was expected when the first sanitary Acts were passed. Why was this? It appeared to him that there were two reasons which in a self-governing country like ours had paramount influence. First, the people immediately concerned had not been sufficiently impressed with the seriousness of the need for advancement. Secondly, they had not had the power under the law to see that their wishes in the matter were complied with. It had been acknowledged from the first that those who suffered most from insanitation were the poorest of our people, inasmuch as besides their exposure to the evils which were the result of neglect on the part of owners of property or Local Authorities, they were the victims of their own carelessness and ignorance. In the course of subsequent remarks Mr. West said: "We have then in the future to follow up the work of the past. We have to keep well in advance of the general opinion of our districts. Not to wait to be told what to do, but to point out to others what needs to be done, to lead the way, to explain, to reason, to be missionaries of health. It is said authoritatively that what is required most at the present time is not legislation but education, and there is undoubtedly much truth in that saying. Could we have each individual in the State made to realise his own duty in these matters by personal conviction, doubtless we should be nearly approaching perfection. But we cannot forget that the law is, at any rate at present, a powerful factor in the education of a vast number of people; to know that a certain thing must be done, helps to prove to them that it should be done, and lead them to inquire the reason why; and until every one is actuated by disinterested desire for the general good, until it is no longer possible for any person to make a profit out of the evil conditions which injure others, legislation, drastic and deterrent, will be necessary. . . . The great demand at present, the great need, is air, pure air; much has been done to secure good

drainage, pure food, pure water, but most remains to be done to give the people pure air. The overcrowding of the people is the most crying evil, and that which is, perhaps, the most difficult to deal with. It is exceedingly doubtful if the most zealous efforts of the best equipped Sanitary Authority in great towns can make the slightest real impression upon the amount of overcrowding existing within its borders. The poor people may be driven from room to room, from street to street, or to an adjoining district, but with a greater number of people compelled to live within a certain area than the houses of that area will legally accommodate, overcrowding is inevitable. One inevitable outcome of the desire to improve upon these conditions has been the application to them of the moral axiom, 'there is always room at the top,' by the erection of tenement dwellings of many stories in height. Even where these have been erected under good supervision, it is very doubtful whether we are not hindering the acquirement of the essential condition of life, pure air. It is, however, a first essential in a vast city like London to do our best, first to modify the bad conditions, in default of ability entirely to remove them, and really well designed tenements would undoubtedly help to that end."

A vote of thanks to the President having been agreed to, the following papers were read and discussed: "Canal Boat Inspection," by Mr. W. L. Wilson; "The Training and Education of Sanitary Inspectors," by Mr. E. Worrall; "The Ethics of Sanitary Inspection," by Mr. A. G. Duck; "Overcrowding and its Remedies," by Mr. T. C. Barralet; "The Sanitary Inspector as a Teacher of Sanitation, especially in Rural Districts," by Mr. T. Blundell; and "The Working of the Shop Hours Act in Bristol," by Mr. F. W. Simpson.

Mr. Barralet, in the course of his paper, said it was the overcrowding *in* dwellings that was fraught with such physical and moral degradation, and the various Public Health Acts had failed to cope with the difficulty. The Public Health Acts were punitive and coercive, not remedial; they gave no definition of overcrowding, and were powerless to deal with the type of overcrowding which might be described as intermittent; they failed also in giving a Sanitary Officer no right to initiate proceedings. At seaside lodgings and boarding-houses it was notorious that overcrowding was rampant, but one seldom heard of proceedings. The "Model" building by-laws, though good in essence, had intensified overcrowding by increasing the cost of building; the author urged that timber-framed cottages should be permitted in the country under restrictions, and that provision should be made to ensure a minimum air space in bedrooms. Public Authorities had not availed themselves to a great extent of the powers to provide dwellings conferred by the Housing of the Working Classes Act of 1890 and cognate Acts. Many of the large towns, however, had attempted to grapple with the overcrowding problem by the erection of dwellings, either in blocks, detached cottages, or lodging-houses, generally with favourable financial results. In rural districts the Act had proved practically abortive through its clumsy and unworkable procedure and the composition of rural governing bodies. All measures aiming at making a working man the nominal owner of the house he lived in by advances from the public funds were to be deprecated as inimical to good sanitation in general, and strongly provocative of overcrowding. Much might be done in mitigation by the encouragement and extension of cheap travel, but it must not be sectional or it would aggravate the evil it was intended to remedy; the zone system as in Austria-Hungary, if adopted by our railways, would cause our cities to grow symmetrically instead of at the least desirable extremities.

During the proceedings the following resolution, moved by Mr. Thomas and seconded by Dr. Brown, was passed: "That the Sanitary Institute be requested to support the petition to the Local Government Board of the Sanitary Inspectors in conference for the appointment of one sanitary inspector at least on the Sanitary Inspectors' Examination Board."

The Conference of Ladies.

The conference of ladies was held in the Medical Lecture Theatre, Mason University College. The Lady Mayoress (Mrs. C. G. Beale) presided, and delivered an address. Various papers were read and discussed.

Conference of Municipal Representatives.

This conference was held in the Examination Hall of the College, Alderman Cook presiding. The chairman dealt in his address with the sanitary progress of Birmingham. The following papers amongst others were also read and discussed: "Dwellings of the Poor," by Dr. J. F. J. Sykes; "Removal of Insanitary Areas and Management of Improvement Schemes under the Housing of the Working Classes Act," by Mr. P. Addie; "Municipal Authorities and Public Slaughter Houses," by Mr. E. Parkes, M.P.; "Village Sewerage Schemes: Experiments in the Rural District of Brixworth," by the Rev. Dr. Cox; "Sewage Disposal and Official Hindrance," by Alderman S. Compston; and "The Chemical Measurement of Ventilation," by Professor F. Clowes.

Conference of Medical Officers of Health.

This conference was held in the Chemistry Lecture Theatre of the college, and was opened by an address by the President, Dr. J. C. McVail. Some other papers were: "The necessity for the amendment of Part I. of the Housing of the Working Classes Act, 1890," by Dr. H. Scurfield; "Sanitary Service in Rural Districts in Ireland," by Dr. J. H. Fergusson, and "Hospital Reform from a Sanitary Point of View," by Mr. T. Garrett Horder. During the proceedings the following motion was proposed and adopted:—

"That owing to the unsatisfactory condition of the sanitary administration in the rural districts in Ireland from the want of independent supervision, the Government be urgently requested to remedy that defect by introducing a Bill early next session requiring the new County Councils to appoint a Medical Officer of Health for each county with the same tenure of office as the present County Surveyors. That the Council of the Sanitary Institute be requested to approach the Government on the subject."

In the evening, the Lord Mayor and Lady Mayoress held a reception at the Council House.

The work of the three sections commenced on Thursday. Our report will be concluded next week.

Correspondence.

To the Editor of THE BUILDER.

ST. SAVIOUR'S, SOUTHWARK.

SIR,—In your note in the *Builder* you say that in my handbook to "The History and Antiquities" of the above church the name of the architect of the new nave is altogether omitted.

That statement is not strictly accurate. Indeed, I think I have mentioned almost everybody and everything connected with my subject, as far as my limited space would allow. I mentioned the name of the builder; I mentioned your own excellent journal; and when I turned to my book I was glad to find that I had not failed to insert the name of our architect (and that conspicuously, as he has a whole line to himself) in a long list of those who have helped to make St. Saviour's what it is in modern times. Do me the favour to read to the cover. W. THOMPSON, D.D.

*** That is to say, that inside the back of the cover (not in the book) there is a formal list of the names of the Restoration Committee, with the architect's name at the foot. We had not seen that, but we do not think it is any answer to our criticism. The book is quite silent about the architect's name where the nave is mentioned and illustrated, nor does Sir Arthur Blomfield's name appear in the index. We observe also that on page 59 the new lectern is mentioned with great approval; this also was the design of the architect, but no mention is made of his name. The name of the lady who paid for it is given; that is the important point, of course; no matter who designed it.—ED.

NEWARK PRIORY.

SIR,—With reference to the letter from Mr. W. Hilton Nash on the above, in your issue of the 24th inst., I have known Newark Priory for some time, and the coffin lid he mentions was visible on the occasion of my first visit, which I see from my sketch-book was in April, 1895. The stone in question marks the position of a building which was probably the gate-house, or one of the other outer offices of the Priory.

I have measured the plan of the remains as far as they can be traced, and the arrangement is distinctly peculiar in one or two respects. You will perhaps allow me to point out some of these peculiarities.

The canons' choir is separated from the transepts by solid walls of sufficient height to allow of the stalls being placed against them, the transepts being spanned in each case by two arches instead of one, the central piers rising from the tops of the above-mentioned walls with buttresses at the backs (that is, in the transepts).

Another point in the plan is the fact that the cross arch at the western end of the choir is placed one bay west of the crossing instead of carrying through the west walls of the transepts, thus subordinating architectural methods to the monastic arrangements.

East of the transepts and on either side of the presbytery is an aisle extending along two bays only out of the three which complete the presbytery. These aisles were open to the transepts, but were approached from the presbytery by the small processional doors only, which are directly east of the transepts, the next bay being entirely shut off, though on the north side are traces of a tomb going right through the thickness of the wall. Also east of the transepts, and opening respectively from the northern and southern bays, are two small chapels, but for some reason which is not quite apparent, the walls of the aisles were not utilised for these, but separate ones built, leaving a space of about two feet only between the two.

The slype is still traceable on the south side, as also is the Dortor night door high up in the south gable. The only trace of the nave is a fragment of the south aisle wall.

I have in my possession an old print dated 1761, which shows the buildings much as they are now, with the exception of the yawning crack which, as Mr. Nash truly says, is endangering the safety of the south gable. F. FORBES GLENNIE.

ARCHITECTURAL LECTURES AT UNIVERSITY COLLEGE.

SIR,—I should be glad if you would permit me to make it known to your readers that the committee of mangement of this college have reduced the fees in the classes of architecture and construction so as to bring them within the reach of students obtaining County Council Scholarships—or others of equal value.

For five guineas a student can now attend a course of forty lectures in either art or construction and also the evening drawing class in the same subject. P. ROGER SMITH.

P.S.—The subject of my public opening lecture on Monday, October 10, at 7.30 p.m. is "Students' Difficulties."

The Student's Column.

SOUND, LIGHT, AND HEAT.—XIV.

SOUND: REFLECTION (*continued*).

THE "whispering gallery" in St. Paul's Cathedral has frequently been quoted as one of the most peculiar effects of the reflection of sound, and has been investigated by many physicists. But authorities are by no means agreed as to the cause of the phenomenon. Atkinson* remarks that whispering galleries are formed of smooth walls having a continuous curved form. The mouth of the speaker is presented at one point and the ear of the hearer at another and distant point. In this case the sound is successively reflected from one point to the other until it reaches the ear. He believes that in this way, in reference to St. Paul's, the faintest sound is conveyed from one side of the dome to the other. It is not heard at any intermediate points. Tyndall also thought the phenomenon was due to an echo, or repetition, whilst other observers attributed it to reflection from the surface of the dome overhead. Lord Rayleigh, however, says the sound "seems to creep round the gallery horizontally." Professor Roger Smith† observes that some whispering galleries depend upon the conduction of sound along a very smooth surface, and others upon its reflection; but, in either case, the surprising loudness with which a whisper uttered at the proper place is heard at some other spot, is due to the coincidence at the hearing point of several rays of sound reaching it at the same time by different paths. Thus, at St. Paul's the sound reaches the point where it becomes audible by two different paths of equal length, so that a double effect is produced on the hearer. This, says the last-mentioned author, is an instance of conduction along the walls.

It is unprofitable to pursue this controversy further; enough has been said to show the student what little has been done towards assimilating a most elementary problem in

* Ganot's "Physics," 1893, p. 219.

† "Acoustics in Relation to Architecture and Building,' 1895, p. 150.

physics in the elucidation of certain peculiarities met with in construction. The laboratory-theatre lecturer has not yet been able to meet the practical constructor on his own ground—and *vice versa*. In our opinion "Ganot" has the best of the controversy, so far.

To our mind, one of the most interesting practical applications of the theory of sound, was the organ-metal reflector erected by Mr. Penrose in St. Paul's to minimise the echo which proceeded from the dome. As most people are aware, a permanent pulpit was erected in the cathedral, and a number of seats were placed in the central part of the church immediately under the dome. It was soon found that the echo from the dome was disagreeable to both preacher and hearers. So, the reflector alluded to was erected in a horizontal position over the pulpit. This metal reflector, the section of which was hyperbolic, and 10 ft. in diameter, was arranged with the *convex* side turned downwards. The object, of course, was to prevent the sound from reaching the ceiling of the dome in its entirety, for if the sound could be broken up satisfactorily, the curved surfaces of the ceiling could not reflect the sound *en bloc*, but could so arrange the reflection that before it could re-reach the floor of the cathedral it was not only much lessened in intensity but the echo was practically lost. The reflector cut off a great portion of the sound which was thrown laterally over the congregation, *i.e.*, in the direction where it was most wanted. With reference to this reflector, Mr. Penrose observed that at a small elevation above the floor, the preacher was not nearly so well heard as he was by persons standing at the same distance and amongst the crowd, notwithstanding the advantage of an undisturbed and direct line of communication above the heads of the congregation. This is certainly a case in favour of a flat curve, as against the older form of parabolic reflector. At the same time, such a reflector is not of universal applicability, and each case must be judged on its merits, depending on the actual form and construction of the interior of the building.

Regarding the phenomena of "whispering galleries" as an exemplification of multiple echoes it is not difficult to apply the principle to other structures. Some echoes repeat the sound twenty or even thirty times; at Woodstock there is one which repeats from seventeen to twenty syllables. Atkinson speaks of a square room with an elliptical ceiling on the ground floor of the Conservatoire des Arts et Métiers, in Paris, as an illustration of acoustic foci. As the laws of the reflection of sound are practically the same as those of light and heat, curved surfaces produce acoustic foci like the luminous and calorific foci produced by concave reflectors. He observes that if a person standing under the arch of a bridge speaks with his face turned towards one of the piers the sound is reproduced near the other pier with such distinctness that a conversation can be kept up in a low tone, which is not heard by any one standing in the intermediate spaces. The square room in the Paris Conservatoire alluded to is said to present this phenomenon in a remarkable degree to persons standing in the two foci of the ellipse.

Sound is reflected not merely by solid surfaces, but even by clouds, and a well-known experiment shows that sound, in passing from a gas of one density into another, is reflected at the line of junction between the two, though, of course, the reflection is only very partial, and depends on the extremes of density existing between the two gases. Thus, in the case of the density of both being nearly the same, the reflection would not be so complete as though the one gas through which the sound first passed was of extreme tenuity and of very low density, whilst the other with which it was in contact was of high density.

Tyndall has shown that a medium of alternate layers of light and heavy gases, such as coal gas and carbonic acid, deadens sound, and also that a medium consisting of alternate strata of heated and ordinary air exerts a similar influence. In another connexion Atkinson observes that so long as the continuity of air is preserved, sound has great power of passing through the interstices of solids. Thus it will pass through twelve folds of a dry silk handkerchief, but is stopped by a single layer if the handkerchief be wetted.

Perhaps the most concise account of the acoustic properties of public buildings, both British and foreign, written in recent years, is that by Mr. H. W. Burrows,* to which we must refer the student for much information on that head. Mr. W. Fletcher Barrett,† in reference to proportion and dimensions of buildings to ensure good acoustic results, states that it appears that for good acoustic properties a building should be so constructed that its different dimensions shall be in some simple relationship to each other. An analogous effect is well known in music, for if two notes have the simplest possible relationship to each other's rate of vibration, as 1 to 2, or an octave, the combination of those two notes is more harmonious than any other combination. Next to this would be the ratio of 2 to 3, or the fifth, and next the ratio of 3 to 4, or the interval of a fourth, and Mr. Barrett carries the illustration much farther.

Some years ago Mr. Heathcote Statham read a suggestive paper at the Institute‡ in reference to the construction and acoustic properties of buildings designed for the performance of music. He observed that it is probable that for the largest class of musical performances, the execution of great works of combined choral and instrumental effect, neither the amphitheatrical nor the theatrical form will be found the most suitable. The form of the complete amphitheatre, though its symmetry and simplicity may seem to recommend it, has this serious disadvantage (when used on a large scale) that the sound, as produced in the orchestra, is not properly controlled and confined in the direction in which it is most wanted. A certain proportion must be observed between height and width, and the wide area of an elliptic amphitheatre requires a lofty roof, with consequently a great space for the production of echo; a space into which the sound is launched with nothing to confine it in the direction of the audience, so that a considerable portion flies off to the roof, and so is wasted, or it is reflected back again and becomes a source of serious disturbance. Something approaching the theatre form is better. The same author referring to materials states that the orchestra should be constructed principally of wood; and the walls of the auditorium lined with wood; but the walls as well as the ceiling require to have their otherwise flat surfaces broken up at intervals by projections to avoid conduction of sound along the walls, and to break up reflection from the ceiling. As to floors, he observes that a room with a flat floor is always unsatisfactory for hearing, and the seats should always rise as they recede from the orchestra; he adopts the principle of Scott Russell's isacoustic curve.

On another occasion Mr. Statham§ claimed that a flat, or nearly flat, ceiling is the best form for a large music hall. It breaks up and assists in destroying echo, whilst a semicircular vault collects and focusses it. Mr. Burrows,‖ in summarising this aspect of the question, remarks that some authors insist upon a curved form for the ceiling; but the nature of the curve is the difficulty. If it be parabolic or semicircular, we have the danger of foci being formed by the reflected sound rays; and it is probably due to this consideration that some urge that the curve should be in the shape of a coach roof. All appear to be in agreement that it is bad to have right-angle junctions between walls and ceiling, as confusing reflections ensue, and, to obviate this, some form of cove has been usually adopted.

BOOKS RECEIVED.

A Pocket Dictionary of Hygiene. B. C. T. Kingzett, F.I.C., and D. Homfray, B.Sc. (Baillière, Tindal, & Cox.)

Der Backstein Romanischer Zeit, Besonders in Oberitalien und Norddeutschland. Von O. Stiehl. (Baumgartner's Buchhandlung, Leipzig.)

Building Construction and Drawing. By George A. Mitchell. Elementary Course. (B. T. Batsford.)

Building Construction and Drawing. By George A. Mitchell. Advanced and Honours Courses. (B. T. Batsford.)

Pumps: Their Principles and Construction. By J. Wright Clarke. (B. T. Batsford.)

Aerial or Wire-rope Tramways. By A. J. Wallis Tayler, C.E. (Crosby Lockwood & Son.)

* R.I.B.A. *Journal*, vol. II., 3rd Ser., 1895, pp. 355, *et sqq.*
† The *Builder*, 1869, p. 404.
‡ R.I.B.A. *Transactions*. 1873, pp. 71, *et sqq.*
§ The *Builder*, 1871, p. 543
‖ *Op. cit.*, p. 359.

GENERAL BUILDING NEWS.

Additions to Tadcaster Church.—The Church of St. Mary at Tadcaster has been enlarged from end to end to give extra accommodation and more vestry room, and a new hot-water heating system has been introduced; the whole work cost 1,224*l.* Messrs. Thompson, of Sherbourne, were the general contractors, the plumbing work being by Mr. Tindall, of Tadcaster, and Mr. G. W. Milburn, of York, executed the carving. The architects are Messrs. Bromet & Thorman, of Tadcaster. The illustration of the new choir doors is given on another page.

Schools, Nanpean, Cornwall.—New schools at Nanpean have just been completed. The main schoolroom is 40 ft. by 18 ft., and, separated from it by movable partitions, are boys' and girls' class-rooms, each 20 ft. by 18 ft. There are also an infants' schoolroom, 26 ft. by 22 ft., and cloak-rooms for boys and girls. The buildings are of St. Stephen's granite. The floors of the school and class-rooms have been laid with wood blocks, and the corridors have tiled floors and dados, the cloak-rooms being finished in cement. The building was designed by Mr. Sampson Hill, of Redruth, Architect to the School Board; and the work was carried out by Mr. F. G. Gilbert, of Trelion, mason, and Mr. T. J. Richards, of St. Stephen's, carpenter.

New Theatre, St. Pancras.—The Vestry of St. Pancras has approved plans for the erection of a theatre on the north side of Crowndale-road, Camden Town.

Presbyterian Church, Benwell.—On September 21 the Presbyterian church erected at Benwell was opened. It is capable of seating between 400 and 500 people, and has class-rooms, kitchen, and caretaker's house. The builder was Mr. T. Hunter, of Washington, co. Durham; and the architects, Messrs. Badenoch & Bruce, of Pilgrim-street, Newcastle-on-Tyne.

Rebuilding, Metropolitan Tabernacle.—In rebuilding this church it has been decided to retain the portico and walls left by the fire. The construction will, as far as is possible, be fireproof, much of the material that was previously wood being replaced by iron. The auditorium will be of the same width as before, but the length will be reduced to the extent of one bay, which is equal to about 13 ft. 6 in. This reduced length, while it enables the pastors to get nearer to the audience, and, as the committee believe, improves the proportions of the building, also gives opportunity to add to the number and size of the vestries, and to provide commodious baptising rooms. The committee have not found it either necessary or advisable to omit the upper gallery. The total seating capacity will be reduced by about 1,000. The heating will be by means of radiators. There will be electric light throughout, with reserve gas supply in the roof and at the entrances, in case of accident. The seats will be more commodious than in the old building, and the aisles will be wider. The exits will be improved, and the committee are negotiating for the hire of a narrow strip of land at the north side of the tabernacle in order to widen the outside passage. The working drawings for the whole of the structure have now been prepared. Messrs. Searle & Hayes, of Ludgate-hill, are the architects.

School Buildings, Aberayron.—These school buildings which have recently been opened consist of a central hall, 45 ft. by 25 ft.; two class-rooms, 20 ft. 16 ft.; master's and mistress's rooms; workshop, 20 ft. by 15 ft.; laboratory, 20 ft. by 15 ft.; music-room, 18 ft. by 15 ft.; kitchen, 26 ft. by 16 ft.; two lavoratories, and out offices. The architect was Mr. Ll. Bankes Price, of Lampeter; and the contractor, Mr. E. Evans, of Llanybyther.

Hotel, Culter, Aberdeenshire.—A hotel is to be erected in the rising suburban district of Culter from plans by Mr. R. G. Wilson, architect, Aberdeen. At the same place a residence costing in all about 7,000*l.*, is to be put up for a gentleman according to designs by Messrs. Beattie & Macdonald, architects and civil engineers, Aberdeen.

New Theatre, Leeds.—The new Queen's Theatre, which is being erected in Leeds, is rapidly approaching completion. It is situated at the corner of Meadow-road and Jack-lane. All the entrances to the various parts of the auditorium are situated under a portico in front of the building, each leading to the hall containing the pay-office, which will have separate windows for stalls and boxes, circles, pit, and gallery. The auditorium will be capable of holding 4,000 people. The dimensions are as follows:—From curtain to back wall of pit, 72 ft.; width of auditorium, 78 ft.; stage, from curtain to back wall of stage, 41 ft. Four exits are provided from the pit, three from the gallery, and two from the dress circle. The builder is Mr. F. S. Davidson, of Newcastle-on-Tyne; and Messrs. W. Hope & J. C. Maxwell, of Newcastle-on-Tyne, are the architects.

Alterations, Drapers' Hall, Throgmorton-street.—The *City Press* states that considerable progress has now been made with the alterations being carried out at Drapers' Hall, in Throgmorton-street, and the work in the interior of the building is being pushed on rapidly. The chief entrance in Throgmorton-avenue is new. The western corridor of the hall has been completely transformed, folding doors having been fitted into the old apertures, and the floor laid in black and

white marble. The building at the top of the new staircase has been extended a distance of 7 ft. towards the avenue, space being thus obtained for a portion of the staircase. The balustrade is of Emperor's red marble, while the panelling is set in a casing of alabaster. The bases of the columns supporting the staircase are of Parian marble. Above are the arms of the Company, ornamented. The upper portion of the wall is lined with marble, in front of which rise numerous columns. Stained glass windows will shortly take the place of those temporarily fitted in the extension. Electric light has been fitted throughout the building, and a new back entrance has been made in Austin-friars. The marble work and carving are being done by Messrs. Farmer & Brindley, of Westminster Bridge-road, and the builders are Messrs. Colls & Son, of 5, Coleman-street.

COUNTY SCHOOL BUILDINGS, CARDIGAN.—The buildings erected for the Joint County School were recently opened by the Mayor of Cardigan. The new school abuts on the main road leading to Gwbert-on-the-Sea. The site is two acres in extent, enabling the managers to provide playgrounds and covered rooms for exercise. The building is constructed of brick, with Bath stone dressings. It contains a spacious assembly hall, class-rooms, lecture-room, laboratory, cookery-room, laundry, workshop, lavatories, &c. The estimated cost of the buildings, irrespective of the site, is 3,500*l*. The architects were Messrs. Morgan & Son, Carmarthen, and the contractors Messrs. J. Williams & Son, Felingunllo.

BAPTIST CHAPEL, ROOKSBRIDGE, SOMERSET.—On September 22, a Baptist chapel erected at Rooksbridge was opened. Seating accommodation has been provided for about 150 persons. The roof and wainscotting are of match-boarding, the former being surmounted by an anaglypta border. Beneath the platform, at the north end, is a baptistry, lined with white tiles. The lighting was carried out by Messrs. Bryant & Sons, of Weston-super-Mare, acetylene gas being utilised, and the chapel and schoolroom, which are connected by a doorway, are heated by low pressure hot-water pipes, the work being done by the same firm. The exterior of the chapel is composed of brick, with Bath stone dressings. Mr. T. C. Stephens was the builder, and the architect was Mr. T. Archibald Cox, of Bournemouth.

ST. STEPHEN'S CHURCH, NORTH BOW.—This church was reopened on Sunday last having been thoroughly repaired at the cost of 1,900*l*. The brickwork has been repointed, new stone has replaced the old where defective, and the whole of the roofs have been renovated. Two large dormer windows have been added at the apex of the nave roof for light and ventilation. The interior of the church, which was of the most gloomy character, has been decorated throughout and presents a more cheerful appearance. On the walls of the chancel on either side of the large east window, which is now partly filled with painted glass, are groups of angels bearing scrolls, from cartoons by Mr. G. Moore Macdowell, the general decorations being executed by Messrs. Heaton, Butler, & Bayne. The nave seats have been widened, and the doors have been removed. The pulpit, which was in the middle of the chancel stalls, is now placed in the nave. The stalls and floor of the chancel, which were on a level with the nave, have been raised, and a tile pavement has been laid by Messrs. Godwin & Sons, of Lugwardine, Hereford. At the back of the stalls carved oak screens now define the chancel, and these have been executed by Mr. J. T. Wilson, of Hampstead-road. The work has been carried out under the direction of Mr. John Medland, architect, the builder being Mr. Martin D. Wills, of Clapham Junction.

COTTAGE HOMES, GATESHEAD.—On September 28 the foundation stone of the Cottage Homes for Children which the Gateshead Guardians are building at Shotley Bridge was laid. The homes are each planned for fifteen children. The bedrooms have accommodation for seven children each, and a spare single bedroom intended for those about to leave the home. The six ordinary homes contain, on the ground floor, hall, staircase, play or day-room, kitchen, scullery, larder, stores, bath-room and lavatory, and foster-mothers' sitting-room. On the upper floor are the children's bedrooms, mothers' bedroom, spare single bedroom, and linen closets. The administrative building contains, on the ground floor, kitchen, scullery, and two sitting-rooms, also board-room, general store, two offices, surgery, and lavatory. Over the central portion of this building are the bedrooms, bath and store-rooms for the use of the superintendent. Behind the administrative building are the workshops, containing carpenter's, smith's, shoemaker's, and tailor's shops, with stable, implement and cart sheds, and other necessary store-rooms. The washhouses and out-offices are placed in the centre at the rear of each block. The cost is estimated at 15,095*l*., including making roads, sewerage, &c. The builder is Mr. Wm. Campbell Tyrie. The architect is Mr. Wm. Lister Newcombe, Newcastle-upon-Tyne.

ST. MARY'S CHURCH, BOLSOVER, DERBYSHIRE.—This church, it may be remembered, was almost entirely destroyed by fire on January 24, 1897. The only remaining portions of the old building are the thirteenth-century tower and spire, portions of the outside walls of the fourteenth-century chancel, the Cavendish chapel, erected A.D. 1618, and the north porch and parts of the outside walls of the north aisle and transept (the latter used as a vestry), which were built about twenty years ago. The former church provided seats for about 500 adults, and it was desired to increase the accommodation as much as possible, retaining the portions of the old building which were not destroyed by fire, and without adding to the length of the church. This has been done by extending the south aisle laterally, about 100 additional seats being thus obtained, the north and south aisles now being of almost equal width, instead of the north aisle being about twice the width of the south aisle, as it was before the fire. The nave has been made 3 ft. 6 in. wider than the one destroyed, thus being restored to the central axis between the western tower and the chancel, as the original thirteenth century nave evidently was. A triple arrangement of roofs over the nave and aisles has been adopted, the nave arcades being carried on octagonal pillars with capitals, as before. Most of the remaining portions of the building having been of the fourteenth century period or style, it has been considered best to build the new portions in the same style, in order to produce, as far as possible, a harmonious whole. The external walls are of Bolsover Moor stone, with Weldon stone for the window tracery, &c. Ancaster stone throughout has been used for the interior, the walls, which were formerly plastered, being now lined with stone, those of the tower having been repaired and pointed only. The woodwork of the roofs is chiefly pitch-pine, the whole stained palm-leaf green. The roofs are covered with Buttermere green slates. The new roof of the Cavendish Chapel is of oak, with carved beams and pendants, &c., and enriched plaster panels in the Jacobean style, and covered with lead. The floors under the seats are of wood blocks. The passages are paved with "terrazzo" and cube marble mosaic. The chancel floor is of marble mosaic, with Devonshire marble steps. The slab tombstones found in various parts of the church have been relaid in the floors of the transept (vestry) and under the tower. Several ancient stone coffin lids with incised crosses have also been discovered, and have been fixed round the base of the tower walls inside. An old piece of carving representing the Nativity (probably part of a fourteenth-century altar piece) has also been preserved and fixed to the wall inside the porch. The new carving has been modelled on that in the Chapter House at Southwell Minster. The doors, seats, choir stalls, &c., are of oak. The font was formerly in Chesterfield parish church, and has been presented to Bolsover Church by the Vicar of Chesterfield. The pulpit, designed by the architect, has been given by Major Hallowes. The total cost of the rebuilding and restoration, with such fittings and furniture as are at present provided, is about 9,000*l*. Another 1,000*l*. will be required to complete the work. Messrs. Bowman & Sons, Stamford, are the contractors. The heating has been carried out by Mr. James Gray, Chelsea, by hot water, on the low-pressure system. Messrs. John Taylor & Co., Loughborough, have re-cast and re-hung the bells, with cast-iron framing. The mosaic floors have been executed by Messrs. Mainzer & Co., Berners-street, London; and the wood-block floors by Messrs. Charteris & Longley, London. Mr. George Wragge, Salford, Manchester, has made the gas-fittings, of wrought iron and brass. The fireproof steel door to the Cavendish chapel is by Messrs. Chubb & Sons, London. Messrs. Jones & Willis, London, have supplied the ornamental wrought-iron door hinges and furniture. Mr. C. Lowe, Sheffield, is the organ-builder. The organ-case is being made by Messrs. Bowman & Sons, from the architect's designs. Messrs. Smith & Co., Derby, have provided the new clock. The stone carving has been executed by Messrs. Tuttell & Son, Lincoln. The architect is Mr. Louis Ambler, London, and Mr. J. C. Walker acted as the clerk of works.

ROMAN CATHOLIC CHURCH, BIRKENHEAD.—The church which is to be built for the Higher Tranmere, Devonshire Park, &c., residents, is to be proceeded with at once. The plans have heen approved by the Bishop of Shrewsbury. The church will probably cost about 5,600*l*., and sitting accommodation will be provided for 600 persons. Mr. Kirby, of Liverpool, is the architect.

SCHOOL, WEST BRIDGFORD, NOTTINGHAM.—A memorial stone was recently laid at the Sunday school buildings now being erected in connexion with the Congregational church, bordering on Muster's-road, West Bridgford. The building is to be of red brick, with stone dressings. In the front gable there is to be a large five-light tracery window, flanked on either side by massive buttresses. There will he four entrances, with lobbies. Two will be approached from Musters-road, and two from Milicent-road. When the contemplated church is built there will be an additional entrance with large lobby, connecting the church with the schools. The buildings will comprise:—A school-room, 56 ft. long by 25 ft. wide, accommodating about 250 adults or 300 children; nine class-rooms, accommodating 15 to 20 children; one young men's room, accommodating 24; one infants' room (temporary), accommodating 30 children; one ladies' room, accommodating 24; superintendent's room and library; kitchen and heating chamber The class-rooms will be arranged on the sides of the large room, with glass folding partitions, so that the class-rooms may be thrown into the school-room when used for concerts or on other special occasions. Advantage of the necessarily deep foundations has been taken to provide for a large store-room and heating chamber under the schools. The superintendent's room, library, young men's room, and ladies' room will have entrances from the lobbies without going into the school-room. The roof of the school-room will be of open timber work, with wrought ties and principals. The whole of the windows will be glazed with cathedral glass, and a portion of each window will be made to open, for ventilation. The contract for the building is 2,200*l*. The builder is Mr. W. Maule, and the architects are Messrs. R. C. & E. R. Sutton, of Nottingham.

POLICE STATION, HUDDERSFIELD.—A new borough police-station erected in Huddersfield, was opened recently. It is contiguous with the fire station, and the buildings cover a site about 990 square yards in area. They are bounded on one side by Back Ramsden-street, on the other by Princess-street; the main front, containing the principal entrance, being in Peel-street. The police entrance and private entrance are from Princess-street, and the prisoners' entrance in Back Ramsden-street, while a subterranean passage connects the building with the court-room in the Town Hall, thus providing for the conveyance of prisoners from the court to the cells with complete obscurity from the public. The buildings are in the Renaissance style, and, being very low in comparison with the adjacent Town Hall and School Board offices, they contrast with the more massive character of these erections. With the exception of the cell wing, which faces Back Ramsden-street, the building comprises two storys only, the lower being for the most part a semi-basement. On this floor are placed the women's cells, seven in number, with the charge office conveniently near the entrance; constables' parade-room, tailors' workroom, strong-room, and various stores for documents, stolen property, &c. On this floor also, and having separate entrances from Back Ramsden-street, are the mortuary and *post-mortem* room and washhouse, whilst occupying the Princess-street angle are the caretaker's house and office. Beneath the women's cells, the floors of which are of concrete, are placed the heating apparatus and stores for fuel, &c., and over these cells, and approached by an inclined way in lieu of staircase, are the male prisoners' cells, two of the nine provided being for sick, and inebriated prisoners, respectively, and isolated from the remainder by a short corridor. One of the female prisoners' cells below is also intended for sick cases, and somewhat modified accordingly in point of size and in other respects, such as the provision of a fireplace Extending over the male prisoners' cells is a spacious general parade-room. On the upper ground floor are the offices for the Chief Constable, chief detective, and their staffs; also superintendent's office, warrant office, men's day-room, solicitors' room (for interviewing prisoners, &c.), as well as public inquiry offices, telephone exchange, and lavatory accommodation for the various departments. Above these offices a parade ground is provided, covering an area of about 260 superficial yards. The contractors were:—Mason, Mr. Alf. Schofield; joiner, Mr. Henry Holland; plumber, Mr. Thomas Armitage; plasterer, Mr. W. E. Jowitt; slater, Mr. T. B. Tunnacliffe; heating, Mr. F. Milan; concretor, Mr. John Cooke; painters, Messrs. W. & P. Holroyd; ironwork, Messrs. Dorman, Long, & Co., Middlesborough; ironwork (sub-contractors), Messrs. Heaps & Co., Huddersfield; carver, Messrs. Thewlis & Co., Leeds; electrician, Mr. E. Liversidge. Mr. Hartley Sutcliffe was clerk of the works. The buildings were designed by the former Borough Surveyor, Mr. R. S. Dugdale.

MUNICIPAL BUILDINGS, GOVAN.—The foundation stone of the Public Halls and Municipal Buildings, Govan, was recently laid. The council chamber will be situated on the ground floor, in the centre of the building. It will have a public gallery with a separate entrance. The burgh officers' rooms will be placed at the entrance to the main hall. The public hall will accommodate 2,000 persons; it is to be oblong, with two aisles, and will have galleries on three sides, with a commodious platform at the upper end, behind which is to be reserved a space for an organ. Round the hall on three sides will be passages providing access to reserved seats and platform, the hall having nine exits to the passages, and the passages six exits to the street. On each side of the principal entrance will be stairs leading to the upper floors. On the first floor are to be accommodated the staffs of the Burgh Surveyor, Cleansing Inspector, and Sanitary Inspector; and here also there is to be a small public hall with seating for 500 persons, having a separate entrance from Summertown-road. On the second floor will be placed the janitor's house, with bunkers and storage rooms, and in the basement a large kitchen, communicating with the two halls by lifts; there are also two heating chambers, strong room for burgh documents, and a fire and draught-proof room for the use of the Inspector of Weights and Measures. The new buildings are estimated to cost 32,000*l*. The architects are Messrs. Thomson & Sandilands, of West George-street, Glasgow.

SANITARY AND ENGINEERING NEWS.

Maidstone Waterworks.—The Maidstone Town Council has decided to promote a Bill in the next Session of Parliament, for the compulsory acquisition of the Waterworks Company, and the extension of the present sources of supply. It is stated that the undertaking will cost the town about 120,000*l.*

Electric Light Installation, St. Nicholas' Cathedral, Newcastle-on-Tyne.—This cathedral, in which the electric light is being installed, was re-opened on September 25. Twenty-three coronas are being suspended from the roof of the side aisles by Messrs. Walker & Coxon, of Newcastle. The general installation is being fixed by Messrs. Rowland Barnett & Co., Limited, of the same city.

Extension of Gasworks, Rotherham.—The first part of the considerable additions to Rotherham Corporation Gas Works has recently been completed. It consists of a retort house and plant, including improvements for the automatic handling of coal and for the economical consumption of coke in the furnaces where the coal is handled for carbonising processes. Upon the coal being tipped up in the shed, it is passed through a crusher, which crushes it into suitable size, after which the coal is lifted by buckets upon an endless chain worked by a gas engine. From the elevator, which is 60 ft. high, the coal is conveyed to the bunkers, each of which is capable of holding about 40 tons, and from thence dropped through shoots into the retorts. It is conveyed to the retort without being touched by hand in any way, the retorts being set at an angle of 32 degrees. The cost of the works as at present completed is about 14,000*l.* The contractors are Messrs. Chadwick & Co., Rotherham, and for the ironwork and retort setting Messrs. R. and J. Dempster, Manchester. Mr. G. Winstanley, of Coventry, is the consulting engineer, and Mr. F. A. Winstanley the resident engineer of the gasworks.

Sea Wall, Herne Bay.—The reconstruction of the sea wall and promenade at Herne Bay, which were so extensively damaged in the destructive gales of last November, is to be proceeded with at once, the estimated cost being placed by Mr. Baldwin Latham at 40,000*l.*

Water Supply, Chard, Somerset.—A Local Government Board inquiry was held at Chard on September 21 relative to an application by the Town Council to borrow the sum of 2,500*l.* for works of water supply. It was stated that the Council contemplated laying a new service of water mains in place of the existing mains, which are old and defective. The present water supply is derived from springs just above the centre of the town, and the yards situate above the level of the springs are without any town supply. Opposition was offered to the scheme by residents outside the area of the town supply on the ground that it would be unfair to charge them a share of the cost of laying pipes from which they would derive no benefit, and it was urged that the Town Council should carry out a proper scheme of water supply for the whole borough. Mr. G. Hodson, C.E., of Loughborough, attended the inquiry, and in very strong terms condemned the present springs from which the town water supply was derived. He declared that he would refuse to be associated with any scheme which contemplated the continued use of water from this source, which he found was liable to contamination at any time.

Waterworks Extension, Bristol.—The erection of the pumping station at Blagdon, Somerset, for the Bristol Waterworks Company is about to be commenced. This work is in connexion with the operations commenced in 1891, of impounding the waters of the Yeo and formation of a reservoir from which the water will be pumped to the present reservoir near Bristol. The reservoir, when completed, will have a capacity of two thousand million gallons. The water will cover a large area about one and three-quarters miles in length, and will be in some parts 40 ft. deep. The pumping station will consist of two large engine-houses with two engines in each, boiler-houses with six boilers, a large chimney tower, the base being 31 ft. square, coal stores, workshops, &c. A light railway is to be constructed in connexion with the works, through Blagdon and Wrington, joining the Great Western Cheddar Vale line, from Bristol to Wells, at Congressberry, a distance of seven miles. The contractors are Messrs. J. Hodson & Son, of Nottingham; and Messrs. T. & C. Hawkesley, of Westminster, are the engineers.

STAINED GLASS AND DECORATION.

St. John's Church, Perry Barr.—A stained glass window has recently been erected in St. John's Church, Perry Barr. The subject is the youthful patron saint, St. John, and the Lamb. The window was designed by Mr. T. W. Camm, of Smethwick, and executed at his studio.

Window, Brampton Bierlow Church, West Melton.—Last week one of the three-light windows in this church was filled with stained-glass. Each of the lights contains two panels under canopy work of perpendicular style. Mr. J. W. Knowles, of York, executed the work.

FOREIGN.

France.—Mme. Adolphe d'Ennery, wife of the well-known dramatic author, has just left to the State her hotel in the Avenue Bois de Boulogne, including the collection of Oriental art which it contains.——A mosque is being built near the Parc Monçeau, the cost of which is borne entirely by the Mussulman colony in Paris. It is to cost about 900,000 francs.——The town of Clichy has just opened a competition for a large educational institution for boys and girls at an estimated cost of 600,000 francs.——A committee has just been formed to erect a monument of the historian Michelet, at St. Georges de Didonne, near Royau. —— The necessary works for the establishment of a line from Laverune to Montbazin have been begun in the Department de l'Hérault.——The discovery of the tomb of Hardouin de Bueil has just been made in the vaults of the Cathedral of Angers. He was bishop in the fourteenth century. The tomb contains much that is artistically interesting.——It is announced that the Duc d'Orléans has ordered one of the most eminent French sculptors to make a statue of the Empress of Austria, to be placed on the shore of the Lake of Geneva, where she was so cruelly assassinated.——The Society "des Amis du Louvre" has already proved itself of use to the Government. This society, founded this year, undertakes to help the Louvre in purchasing works of art. It has already bought several pictures, amongst them the "Virgin," by Piero della Francesca. The recognition of this society by the State enables it to receive donations and legacies.——The death of M. Alexandre Joseph Marie, at the age of sixty-one, is announced. He was architect to the Ville de Paris, Member of the "Commission d'Hygiène, and expert for the Tribunaux de Paris.

Canada: Proposed Bridge, Quebec.—At the annual meeting of the Quebec Bridge Company, held on September 6, at Quebec, it was decided to at once call for tenders for the construction of the bridge, which is estimated to cost from $3,000,000 to $4,000,000. The amount of capital so far subscribed is $286,000, The directors' report states that the Dominion Government has given assurances that a subsidy of 33⅓ per cent. of the cost of the enterprise would be voted at the next session of Parliament. It is expected that the Province of Quebec and the City of Quebec between them will vote subsidies amounting together to another third of the cost, and the balance of the cost will be met by issuing bonds. Attached to the report are extracts from those of the engineers, Messrs. Shanly, Shrieber, Gauvin, and Hoare, showing the impossibility of constructing the bridge for a reasonable sum elsewhere than opposite the Chaudiere. The river is 2,595 ft. wide at high water, 43 ft. deep here. From the bed of the river to the lower edge of the bridge the distance will be 193 ft., and the length of steel bridging will be 3,100 ft. It is the intention of the Company to construct and own themselves the lines from the bridge into the City of Quebec, and also that from the south end of the bridge, which will connect at a concentrated point with all the railways on the south shore. On the north end traffic will be taken from the bridge to Quebec by either of two lines—one passing into the city along the coves on the north side of the river, and the other on the St. Foye village, entering the city by the St. Charles River valley.—*Canadian Gazette.*

Western Australia.—The prospectus of the intended Mining and Industrial Exhibition at Coolgardie, to be opened on March 21 next year, states that the original proposition was to hold a mining machinery exhibition, to be opened in October, 1897, but the proposal received so much support in the Colony that it became necessary to fix upon a later date, and to make the exhibition a more comprehensive one. It is now to be called "The Western Australian International Mining and Industrial Exhibition," the objects of which should be to obtain the fullest and best possible display of mining and other machinery, and of all kinds of manufactures suited to the requirements of the mining, timber, and agricultural industries of the Colony, and to its growing population. The Government of the Colony has agreed to frank all exhibits from the port of arrival, to and from Coolgardie, over their railways, and to treat the exhibition buildings as a bonded store, so that no charges will be made for freight or custom dues, excepting on goods sold in the Colony. The charges for space are exceedingly moderate, the commissioners being anxious, in the public interest, to offer every inducement to manufacturers and others to use the exhibition. Arrangements are being made to secure full exhibits of the various products of Western Australia —minerals, food, staples, timber, &c.,—and to obtain representative exhibits from the other Australian colonies, while varied collections are assured from Great Britain, America, Canada, the Continent of Europe, the Cape, and India. Arrangements for Great Britain and the Continent are in the hands of the Special Commissioner, Mr. E. T. Scammell, who will be prepared, on behalf of the Commissioners, to ensure the transit of all exhibits at moderate rates, by duly appointed forwarding agents, and the safe custody of the exhibits on arrival in Western Australia. Certificates of merit will be awarded in every section, special certificates being given for exhibits showing superlative merit. Copies of the regulations and forms of application for space may be obtained from the London Office of the Exhibition, 18, Queen Victoria-street, E.C., or from the Agent General's Office, Victoria-street, S.W.

Victorian Institute of Architects.—The *Building, Engineering, and Mining Journal* (Melbourne) publishes the particulars and conditions for prize competitions offered by the Royal Victorian Institute of Architects, which are open to all members of recognised Institutes of Architects of the Australasian Colonies. They consist of the R.V.I.A. Silver Medal for the best design for a building for chambers for twenty physicians and surgeons, with rooms for manager and attendants, waiting and consulting rooms, together with all necessary accommodation, and showing method of sanitation; the R.V.I.A. Bronze Medal, for the best design for public swimming baths and gymnasium. A prize of four guineas for measured drawings, the subject to be the stone pulpit and the eastern stairs to it in Scot's Church, Collins-street, Melbourne; and a prize of two guineas for sketches of subjects to be selected by the competitor.

MISCELLANEOUS.

Professional and Business Announcements.—Mr. Howard Ince, architect, has removed his address from 21, King William-street, Strand, to 35, Lincoln's Inn Fields, W.C.——Messrs. Leslie E. Clift & Co. have purchased the business of Messrs. Hare & Co., wood-engravers and photo-engravers, of 7, Bride-court and 22, Bride-lane, E.C., and will in future carry on the business at the same address, under Mr. Leslie E. Clift as manager, but retaining the name of "Hare & Co." The staff of Messrs. Hare & Co. have been retained in conjunction with the staff of Messrs. Leslie E. Clift & Co.——We learn that a new company has been formed to carry on the manufacture of the various patents of the N.A.P. Window Company.

Abbey Mansions.—It appears that we were led into an error last week, through adopting a statement in a daily paper to the effect that this building was to be pulled down, which turns out to be incorrect. It is, in fact, being strengthened in order to render it secure for occupation. We have since learned however, on the best authority, that the Office of Works, which was under an agreement to take over the building, has declined to carry out this agreement.

The Italian Hospital, Queen-square.—It is stated that Commendatore J. Ortelli has generously undertaken to defray the cost, about 20,000*l.*, of the new buildings to be erected on the square's south side between Devonshire and Gloucester streets. The architect, we gather, is Mr. Cutler, and the contractors Messrs. Holloway Brothers.

Proposed Byron Statue for Aberdeen.—A public meeting to promote the erection of a statue of Lord Byron will be held on October 15 in Aberdeen Grammar School. The supporters now number about 200, and the success of the scheme is assured.

Fire at Bisham Abbey, near Marlow.—A fire broke out on Saturday, September 24, at Bisham Abbey. The flames originated in the roof, part of which, and several old oak beams, were removed. The damage was not very extensive.

Public Works, Scarborough.—On September 26 a Local Government Board inquiry was held at the Scarborough Town Hall with respect to the application of the Town Council for approval of the disposal by the Council of certain corporate land, situated in Seamer-road, and borrowing 33,575*l.* for the purchase of St. Nicholas House estate for municipal purposes, and for purposes of public walks and pleasure grounds. It was explained that the North-Eastern Railway Company required the land for the purpose of increasing their siding accommodation, and, subject to the approval of the Local Government Board, would pay 350*l.* per acre for the land, at the same time agreeing to a condition imposed by the Council to allow a bridge to be made over the railway so as to connect Seamer-road with the Weaponness estate, the railway company undertaking to pay 2,500*l.* towards the cost of the bridge.

Proposed Almshouses, West Hartlepool.—The Diamond Jubilee is to be commemorated in West Hartlepool by the erection of almshouses, and eight gentlemen have intimated their intention of defraying the cost of as many buildings.

Public Works, Saffron Walden.—A Local Government Board inquiry has been held at the Town Hall, Saffron Walden, respecting the application of the Town Council for sanction to borrow a sum of 1,400*l.* for footpath improvements. At a meeting of the Town Council a memorial was presented signed by several ratepayers, stating that at present some parts of the borough were insufficiently sewered, and others wholly deficient in public sewers, and insisting upon the first importance of the sewerage question.

East London Technical College.—We have received the calendar of this institution for 1898-99, with the list of classes in engineering, chemistry and physics, mathematics, applied mechanics, machine construction and drawing, building construction and drawing, smiths' work, pattern making, electrical engineering, drawing, wood carving, carpentry, bookbinding, &c., &c

THE ARTS AND CRAFTS EXHIBITION, MANCHESTER.—There was a numerous audience in the City Art Gallery on September 26, when Mr. William Burton gave the first of a series of four lectures, arranged by the Northern Art Workers' Guild, in connexion with their Arts and Crafts Exhibition now being held. Mr. Edgar Wood presided, and Mr. Burton took as the subject of his lecture "Everyday Art." He briefly explained what were the necessary conditions any piece of work must possess before it was artistic at all. First came truthfulness and directness, simplicity and utility. Then came appropriateness, harmony, and unity, not only in the component parts of the piece of work itself, but harmony of the work with its entire surroundings, and last of all the vital qualities which distinguished high art from that which was not art; breadth, imagination, invention, and individuality. An artist was a man who could manage to combine absolute utilitarian necessities with refinement and beauty by the simplest means. Any article of utility designed by an artist would seldom need any added ornament, though in some instances ornament had its uses, and plain surfaces were apt to become monotonous. But ornamentation required the gift of selection and restraint, with due regard to fitness and appropriateness. He then dealt with naturalism and conventionalism, as applied to art, and altogether his lecture, illustrated as it was by means of limelight representations of appropriate examples of his chief points, was of a very interesting and practical nature.—*Manchester Courier.*

LEGAL.

A BUILDING DISPUTE.

THE case of Kitson *v.* Saunderson came before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., on the application of the plaintiff for an injunction to restrain the defendant from the erection of a certain wall. When the case was called on, Mr. Kenyon Parker, for the plaintiff, said that the action had been settled, and the motion could therefore be struck out.

Mr. Alexander, Q.C., for the defendant, said that his learned friend might be right, but it was the first he had heard of the case having been settled.

Mr. Kenyon Parker said he understood that the defendant had bought the plaintiff out.

His Lordship: Let the case be struck out, and, if there is any misapprehension about it, it can be reinstated.

In the result, his lordship directed that the motion should stand for a week, in order that it might be ascertained what had been done in the matter.

IMPORTANT BUILDING DISPUTE.

MANDATORY INJUNCTION GRANTED.

THE case of Keeble *v.* Poole came before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., on an application by the plaintiff to restrain the defendant, his servants, agents, and workmen, from erecting any wall or building so as to darken or obstruct the ancient lights of the plaintiff's premises, situate in Rupert-street, W.

Mr. Alexander, Q.C., who appeared in support of the application, stated that the plaintiff asked partly for a mandatory injunction that the defendant might be ordered to pull down so much of his wall between 8 and 9, Rupert-street, recently erected by him, or any other walls or buildings which interfered with the ancient lights of the plaintiff.

Mr. Lowe, counsel for the defendant, said he had been looking at the evidence in the case, and he was bound to say he was not able to contend that some rights of the plaintiff had not been infringed, the extent of the infringement being another matter. He had therefore advised the solicitors who instructed him that the proper course was to endeavour to negotiate between the two neighbours and get the matter adjusted. He (counsel) thought that if the matter was suspended for another week something might be done in some way. He agreed that his learned friend had a strong case, but at the same time he thought it was a matter which could be met by adjustment between the parties, and he thought that would be the proper way to deal with it.

Mr. Alexander said he must press for the injunction because there had been a breach of good faith on the part of the defendant; and, moreover, last week, when he gave an undertaking not to do anything in the terms of the notice of motion, he had, in spite of his undertaking, gone on with the building during the week, and he (counsel) was really in a position, if he felt vindictive, to move to commit the defendant for contempt for breach of his undertaking. Therefore, it was impossible to meet the defendant. On September 8 architects met on the ground with reference to the underpinning of the fence wall in question, and on that occasion it was stated what they were going to do as regarded the erection, and the plaintiff objected. The defendant thereupon undertook not to proceed with this work until some arrangement had been come to. That undertaking, given on the 8th, was not in dispute. What happened was this. On September 10, which was a Saturday, the plaintiff went down to see the premises and discovered that, notwithstanding the undertaking given on the 8th, the defendant had put a body or gang of men not to continue their work all round but to work on the party fence wall and get it as high as possible before the plaintiff could take proceedings. On the Saturday afternoon the plaintiff gave the defendant's builder and surveyor written notice to refrain from doing this, but, notwithstanding that, the building was continued all Sunday night and was only stopped on the Monday morning when the wall was raised from 11 ft. 6 in. to 34 ft. 6 in., and the defendant intended to raise it another 20 ft.

In the result his Lordship, after hearing Mr. Lowe for the defendant, said his view was that the defendant's building ought to be pulled down to the position in which it was on September 8; but as this was the Long Vacation, and the defendant could not take the opinion of the Court of Appeal on the subject (if he wished to do so), he (his lordship) thought that the order should be suspended for five weeks in order to allow the defendant to go to the Court of Appeal.

Mr. Alexander pointed out that the defendant had a remedy, notwithstanding the vacation, under Section 52 of the Judicature Act.

His lordship, after some further discussion, suspended the operation of the mandatory injunction for fifteen days, and on the other part of the case granted the plaintiff an interim injunction in the terms of the notice of motion until the trial, and directed that the plaintiff should have his costs in any event.

ALLEGED OBSTRUCTION OF LIGHT AND AIR.

THE case of Lefevre *v.* the Cleveland House, Limited, was in the list for hearing before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., it being an application by the plaintiff for an injunction to restrain the erection of a building by the defendants so as to obstruct the access of light and air to the plaintiff's premises.

When the case was called on, counsel for the plaintiff stated that both parties had agreed that the motion should stand over for a week or a certain agreed time.

Order accordingly.

ALLEGED OBSTRUCTION OF ANCIENT LIGHTS.

THE case of Oppert *v.* Cochrane and Others was in the list for hearing before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., on the application of the plaintiff to restrain the defendants from carrying on building operations so as to obstruct his ancient lights.

When the case was called on, counsel stated that the motion ought not to have been in the list at all. When the case was before the court last week it was ordered to stand over for a fortnight.

His Lordship: I have it marked "Stand over for a week" and that is how the officer of the court made the mistake, I suppose. However, let it stand till next Wednesday.

Order accordingly.

ANCIENT LIGHT DISPUTE.

THE case of Brown *v.* Sheinman and Volk was in the list for hearing before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., on the application of the plaintiff to restrain the defendants from erecting buildings so as to obstruct his ancient lights.

When the case was called on, Mr. Kinyon Parker, for the plaintiff, said that all parties agreed that the case should stand over till next week.

Counsel for the defendants said he consented, but it was the first he had heard of it.

DISPUTE AS TO BUILDING EXCAVATIONS.

THE case of Bagby and Harper *v.* Dowen and Another was in the list for hearing before Mr. Justice Channell, sitting as Vacation Judge, on the 28th ult., on a motion by the plaintiffs to restrain the defendants from carrying on certain building excavations.

When the case was called on, counsel stated that his lordship had already granted an interim injunction restraining the defendants in the terms of the notice of motion, and the defendants now consented to submit to a perpetual injunction, and to treat the motion as the trial of the action. In these circumstances the plaintiffs would not ask for costs.

His lordship assented to the application, and made an order accordingly.

MEETINGS.

SATURDAY, OCTOBER 1.

British Institute of Certified Carpenters.—Mr. J. Clark on "Graphic Statics applied to Carpentry Structures." 6 p.m.

Sanitary Institute.—Congress at Birmingham: Excursions.

MONDAY, OCTOBER 3.

Liverpool Architectural Society. — First Ordinary Meeting. 6 p.m.

Society of Engineers.—Mr. Sherard Cowper-Coles on "Protective Metallic Coatings for Iron and Steel." 7.30 p.m.

TUESDAY, OCTOBER 4.

Northampton Institute, Clerkenwell.—Mr. F. Bond on "Traceried Windows." 8 p.m.

WEDNESDAY, OCTOBER 5.

Edinburgh Architectural Society.—Mr. A. R. Scott on "Vaulting." 8 p.m.

Builders' Foremen and Clerks of Works' Provident Institution.—Ordinary meeting. 8 p.m.

FRIDAY, OCTOBER 7.

Architectural Association.—President's Opening Address and Distribution of Prizes. 7.30 p.m.

RECENT PATENTS:

ABSTRACTS OF ACCEPTED SPECIFICATIONS.

Open to opposition until November 7.

[1897] 19,955.—SLEEVES OR SOCKETS FOR SIMULTANEOUSLY CONNECTING GLOBES, REFLECTORS, AND THE LIKE TO ELECTRICAL INCANDESCENT LAMPS: *C. Bartenstein.*—This is made in the shape of a lamp-foot or base, and is screw-threaded. Into an inner tube is screwed the pear-shaped globe, with the result that one contact of the lamp meets a contact which is as usual secured to the outer part of the sleeve by an insulating piece, whilst the other contact of the lamp is electrically connected with the sleeve or socket's outer part through the inner tube. In placing the reflector (or globe or dome) on the lamp it is slipped with its centrally perforated part over the inner tube, and secured in position by a nut having a wide flange, the reflector's top being made to bear against the enlarged lower edge of the socket's outer part.

20,063.—SINKS, JAW-BOXES, WASHING-TUBS, TROUGHS, &c.: *S. Robertson.*—The inventor's object is to reduce the risk of breaking brittle articles when being washed, and to replace the bottom of the sink when worn. He substitutes a bottom of india-rubber, or fibre gutta-percha, or wood—the sides of the sink or trough being made of porcelain, fire-clay, metal, or wood. In the case of, for example, a fire-clay enamelled sink of the ordinary square or Belfast pattern, a horizontal flange protrudes outwardly from the four sides, the flange is perforated, a sheet of india-rubber is laid to form a bottom, and underneath the rubber is placed a sheet of iron; the flanges and the rubber and iron sheets are fastened by strips of iron, the whole being screwed together. By another method the bottom of the sink may be made of plain fire-clay, to be covered by an india-rubber sheet sunk within grooves in the sides of the sink.

20,265.—SANITARY CLOSETS AND CULINARY DRAINAGE: *A. H. Stott.*—The device relates to improvements in apparatus for consuming urine and soil, and vaporising culinary water from the slop-stone. The apparatus consists of three 10-in. burners and an oil cistern fixed beneath a spiral flue, at whose top is placed the closet seat, with pan and valves for delivery into the flue, the oil for saturating the dried soil in the flue is discharged through a ¾-in. pipe long enough to contain a gallon of oil, the burners under the perforated plate are lighted by iron balls trimmed with cotton web steeped in oil, which roll down the spiral incline.

22,170.—LIGHTING OF PASSAGES, CORRIDORS, AND OTHER PLACES: *W. G. Inglefield.*—For places where a light is needed only occasionally, or in different parts, the lamp—whether oil, gas, or electrical—is suspended from a wire or similar device mounted throughout the entire length of the passage or corridor, the suspension being effected by means of a ring or loop and a length of elastic material. When an electrical lamp, or a gas lamp supplied through a flexible tube, is used, a sufficient length of conducting wire is allowed for the full traverse of the lamp, and the wire is hung in loops from the carrier wire.

23,184.—SASH FASTENER FOR WINDOWS: *J. Walsh.*—On the lower window's top frame is screwed a bracket which has two lugs or sides, and carries an eccentric and a lever working on a pin between the two lugs; the eccentric is fitted with a strap or ring which has a curved or hook-shaped projecting piece passing under a guide between the two lugs and engaging with a loop-shaped bracket screwed on the top-window's lower frame; the window is unfastened by pulling the lever on the eccentric and so causing the eccentric block to travel round the pin's top side and draw the hook out of the loop, it is fastened by pressing the lever in an opposite direction and so causing the eccentric to first travel downwards towards the loop which receives the hook, a further depression of the lever causes the eccentric to travel still downwards away from the loop, and so presses the hook's under-side against the bottom of the bracket, thus raising the hook's point and making it engage with the top of the loop.

23,778.—APPARATUS FOR RETAINING WINDOW SASHES, &c.: *W. A. Stevens and A. H. Buss.*—A stop, having a curvilinear face and a tongue and guides, is mounted in a cage fitted in the frame or sash, and has grooves to receive the tongue or guides, a spring in the case bears upon the rear of the stop, and on or in the edge or faces of the sash or frame is fitted a curved path, consisting of reversely curved parts joined by inclined straight parts, so disposed as to form an irregular path which causes the spring to be compressed with a less traverse of the sash when descending than when ascending, thus the external force required for raising or lowering the sash is reduced.

23,930.—STEELYARD WEIGHING MACHINES: *W. E. Hipkins.*—The claim is for the use of a counterpoise or jockey weight, arranged to slide upon a supporting tube or rod fixed at the side of and lengthwise with the steelyard, the said weight being so arranged that its centre of gravity falls below its supporting tube or rod, and on the side of it, adjacent to the steelyard.

[1898] 5,073.—ORNAMENTING GLASS, TRANSPARENT MATERIAL, &c.: *E. J. Lutwyche.*—The back of the tile, panel, or mosaic, is crimped, rippled, or corrugated; after precipitation of silver, the silvered surface may be coated with brilliant metallic paint, leaf silver, tin, or other metal, and the coating is covered or backed with a lead or metallic paint, or with asphaltum. The tiles are made of coloured glass, bleached resin, and similar substances, except crystal or flint glass.

9,340.—ELECTRICAL SAFETY FUSES OR CUT-OUTS: *Veritys, Limited, and L. J. Steele.*—The fuse device has a shifting chamber, tube, or trough, containing an insulating material or fluid, which is held in check or suspension against an automatically moving force by the fuse

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Pump Room	Harrogate Corp.	50*l.* 30*l.* and 20*l.*	Jan. 2, '99

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered
Engine Shed, &c. Truro	G. W. Ry. Co.	G. K. Mills, Paddington Station, W.	Oct. 4
Goods Shed, Swansea	do.	do.	do.
Additions to Schools, Brierley Hill, Staffs.	Kingswinford U.D.Sch. Bd.	A. Price, 34, Moor-street, Brierley Hill	do.
Sewerage Works	Aberdeen T.C.	W. Dyack, Burgh Surv. Town House	do.
Boiler House, &c. Fir Vale Workhouse	Sheffield Union	J. Clark, Archt 55, Norfolk-street, Sheffield	do.
Flagging, &c.	Urmston(Lancs.)U.D.C.	C. C. Hooley, C.E. Council Offices	do.
Whinstone, &c.	Whickham (Durham U.D.C.	T. Lambert, Town Hall Gateshead	do.
Paving, &c. Moses-street and Others	Keighley Corp.	W. H. Hopkinson, C.E Low Bridge, Keighley	do.
Broken Stone, &c.	Handsworth (Staffs.) U.D.C.	E. Kenworthy, Surv. Council House	do.
Electric Plant, &c.	Dundee Gas Commrs.	W. H. Tittenson, Engr. Dundee	do.
*Road Making	Lewisham B. of W.	Surveyor's Dept. Town Hall, Catford, S.E.	do.
*Wood Paving Works	Westminster Vestry.	G. R. W. Wheeler, Town Hall, Caxton-street, S.W.	Oct. 5
Sewage Filter, &c. Tattingstone, Suffolk		A. T. Cobbold, 32, Museum-st. Ipswich	do.
Twenty-two Houses, Shildon, Durham	N.E.Ry. Co.	Wm. Bell, Archt. York	do.
Road Works, Carrington, &c.	Bucklow R.D.C.	J. Burgess, Surv. 7, Market-st. Altrincham	do.
Streets and Sewers, Caerphilly, Wales		E. W. M. Corbett, Surv. Castle-st. Cardiff	do.
Two Houses, Baslow, Derbyshire		E. M. Longsdon, Archt. Town Hall, Bakewell	do.
Paving, &c. Several Streets	Radcliffe (Lancs.) D.C.	Surv. Council Offices	do.
Drainage Works, Whimble Hill, Crondall	Farnham & Hartley Wintney School Mgrs.	E Kempson, 121, West-st. Farnham	do.
Alterations, &c. Police Court, Middleton, Lancs.	Standing Joint Comte.	H. Littler, County Offices, Preston	do.
Street Works, Gloucester-road, &c.	Littlehampton U.D.C.	H. Howard, Surv. Town Offices	do.
House and Shop, Fountain-st. Morley		Buttery & Birds, Archt. Queen-st. Morley	Oct. 6
Two Blocks Conveniences, Helmet-st. Recreation Ground	Manchester Corp.	City Surv. Town Hall	do.
Kerbing, &c. High-st.	Southend-on-Sea Corp.	A. Fidler, C.E. Clarence-street	do.
Rowley Granite	Quarry Bank (Staffs.) U.D.C	A. Homfray, Cradley Heath	do.
Farnham Flints and Gravel	Weybridge U.D.C.	J. S. Crawshaw, Council Offices	do.
Road Works, Beecher-st. &c.	Halifax Corp.	E. R. S. Escott, C.E. Town Hall	do.
Cast Iron Water Pipes, &c. Rowland's Gill	Blaydon-on-Tyne U.D.C.	W. H. Stephenson, Engr. Council Offices	do.
Whinstone, &c.	do.	do.	do.
Shop, &c. Prospect-place, Bridlington Quay	G. Wortley	J. Earnshaw, Archt. Bridlington Quay	do.
Additions to School, Stoughton	Guildford (U.D.) Sch. Bd.	E. L. Lunn, Archt. 36, High-street, Guildford	do.
*Supply and Fixing Pipes, Valves, &c.	Islington Vestry	J. Patten Barber, Vestry Hall, Upper-st. Islington	Oct. 7
Church, Hindaford, near Atherton	Rev. J. Preston	Austin & Paley, Archt. Castle-hill, Lancaster	do.
Hospital, Morrison, Elgin, N.B.		Reid & Wittet, Archt. Elgin	do.
Offices, Wall, &c. South-st. Egremont		A. L. Buchanan, Beckermet, Cheshire	Oct. 8
Stone Bridge, Saltburn, Yorks.		W. Stead, C.E. County Offices, Northallerton	do.
Broken Granite, &c. (1,500 tons)	Bishop Stortford U.D.C.	W. Gee, Council Offices	do.
Granite Setts, Swinton, Lancs.	Swinton & Pendlebury U.D.C.	H. Entwistle, Surv. Council Offices	do.
Subway, &c. Queen's Dock Basin	Hull Corp.	F. J. Bancroft, Engr. Town Hall	do.
Granolithic Footpaths	Londonderry Corp.	City Surv. Guildhall, Derry	do.
*Mortuary at Infirmary	St. Marylebone Gdns.	A. Saxon Snell, 22, South-ampton-bldgs. Chancery-lane, W.C.	Oct. 10
*School	Rowley Regis, S.B.	Offices, Old Hill, Staffs.	do.
Sewering, Flagging, &c. Carlisle-street	Hindley(Lancs.)U.D.C.	A. Holden, C.E. Council Offices	do.
Granite Road Metal	Sittingbourne U.D.C.	W. J. Harris, Council Offices	do.
Street Works, Chadwell St. Mary	Orsett (Essex) R.D.C.	R. T. Stewart, Surv. Orsett	do.
*Guernsey Granite Spalls	Lewisham Union	H. C. Mott, 280, High-st. Lewisham	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Boiler House	Cheltenham Corp.	Water Engineer, Municipal Offices	Oct. 12
Bridge, Totteridge	Herts. C.C.	U. A. Smith, Surv. 41, Parliament-street, S.W.	do.
*Roads and Footways	Barnet U.D.C.	W. H. Mansbridge, 40, High-street, Barnet	do.
*New Bridge	Hertford C.C.	U. A. Smith, 41, Parliament-street, S.W.	do.
Isolation Hospital, Tindale-crescent, near Bishop Auckland	Auckland, Shildon & Willington Hospital Board	W. Perkins, Archt. Victoria-street, Bishop Auckland	Oct. 13
*Iron Hospitals	Sandown and Shanklin Hospital Board	Clerk, Town Hall, Sandown, I. of W.	do.
Public Baths	Romford U.D.C.	Barrington & Ley, Archts. 108, Fenchurch-st. E.C.	Oct. 14
Hall and Buildings, London-road	Southborough U.D.C.	W. Harmer, Surv. 137, London-road	Oct. 15
Almshouses, Lyme Regis, Dorset		W. J. Flecher, Archt. Wimborne	do.
*Hall and Buildings	Southboro U.D.C.	W. Harmer, 137, London-road, Southboro	do.
*Buildings, Chimney Shaft, &c.	Bangor Corp.	J. Gill, Town Hall, Bangor	do.
Additions to House, &c. Brynhyfryd, Ruthin	School Governors	J. Hughes, Archt. Denbigh	Oct. 17
Additions to School, Llandaff	Governors	G. E. Halliday, Archt. Cardiff	Oct. 18
*Enlargement of Telegraph Factory	Commrs. H.M. Works	Offices, Storey's Gate, S.W.	do.
Sewerage Works	Wilmslow (Cheshire) U.D.C.	W. Cobbett, Swan-street, Wilmslow	Oct. 21
*Schools	Tottenham Sch. Bd.	G. E. T. Lawrence, 181, Queen Victoria-st. E.C.	Oct. 21
School, Locking-road	Weston-super-Mare Sch. Bd.	Wilde & Price, Archt. Weston-super-Mare	Oct. 26
*School and Caretaker's Cottage	Wanstead Sch. Bd.	J. T. Bressey, 70 and 71, Bishopsgate-st. Within, E.C.	Oct. 27
Alterations, Horse-shoe Inn, Shire Green		G. A. Wilson, Archt. Hartshead-chambers, Sheffield	No date
Additions to Grammar School, Chesterfield		W. H. Wagstaff, C.E. Chesterfield	do.
Town Hall	Colchester Corp.	H. C. Wanklyn, Town Clerk Colchester	do.
Paving, &c. Main Roads	Kingsthorpe U.D.C.	J. Ingman, Surv. Fish-st Northampton	do.
Bakery, &c. Cork	J. Simcox	A. Hill, Archt. 22, George's-street, Cork	do
Ten Houses, Folly Hall	Huddersfield Indus. Soc.	J. Berry, Archt. 9, Queen-street, Huddersfield	do
Alterations, &c. Fleece Inn, Eldwick, near Bingley		Hutton & Co. 74, Albion-street, Leeds	do
*Chelsworth Hall, Lavenham, Suffolk		W. E. Trevena, Ridgemount, Farnboro'	do
Alterations, &c. Business Premises, Charlotte-street, Hull		T. B. Thompson, Archt. 15, Parliament-street, Hull	do.
House, Mannville-road, Lund Farm, Keighley		Judson & Moore, Archts. Keighley	do.
Business Premises, Parliament-street Harrogate	J. Hunter	Bland & Bown, Archt. Harrogate	do.
Bakery, Balsall Heath, Birmingham		T. G. Price, Archt. 63, Temple-row, Birmingham	do.
Roads, &c. De Ferriers Estate, Harrogate		H. E. & A. Bown, Archt. Harrogate	do.
House, Llanerch, Llanelly		W. Griffiths, Archt. Falconchmbrs Llanelly	do.
House, Longtown, near Abergavenny	Longtown U.D.Sch.Bd.	E. A. Johnson, Archt. Abergavenny	do.
Three Cottages, High-street, Blackwood, Mon.		T. Price & Sons, Circle, Tredegar	do.
*Fifty-three Cottages and Five Blocks of Tenements	Tunbridge Wells Corp.	Boro Surv.	do.
*Enlargement of Baths and Washouses	Islington Vestry	A. H. Tiltman, 6, John-st Bedford-row, W.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Clerk of Works	St. Mary Extra, Shaling and Hound Sch. Bd.		Oct. 5
*Inspector of New Buildings and Drainage Work	Hornsey U.D.C.	160*l.* per annum	Oct. 8
*Surveyor of Highways	Spalding U.D.C.	100*l.* per annum	Oct. 11
*Clerk of Works	Weston-super-Mare S.B.	2*l.* 2*s.* per week	Oct. 19
*Engineer, Surveyor, and Sanitary Inspector	Wembley (Mid.) U.D.C.	220*l.* rising to 280*l.*	do.
*Architectural Assistant	H.M. Dockyard, Devonport		No date
*Clerk of Works	Mansfield Sch. Bd.	4*l.* per week	do.

Those marked with an asterisk (*) are advertised in this Number. ***Competitions,*** p. iv. ***Contracts,*** pp. iv. vi. viii. x. & xvii. ***Public Appointments,*** pp. xv. & xvii.

wire that passes through the tube, and whose free ends are connected with the terminals upon the switch-board or block within the circuit. The parts are so arranged that when the fuse wire "blows" its loose free end is instantly and at a multiple rate drawn within the tube or chamber, and under the insulating material therein, so that, according to the claim, the possibility of any electric arc being formed is prevented.

13,248.—Glass Panes for Windows and Other Illuminating Purposes: *O. E. Winger.*—The panes are made in various ways: (*a*) built up of a number of blocks of glass placed together with their faces in contact, the faces being smooth and polished, whereby the upper face of each block forms the light-reflecting surface; (*b*) with a series of openings or cavities, disposed lengthwise between the two surfaces, whose upper walls act as reflecting surfaces, while the side walls act as refracting surfaces; (*c*) with a series of tapering cavities that extend lengthwise into the pane from one edge, while another similar series extends into the pane from the opposite edge; the upper walls of the cavities constitute the reflecting surfaces, and the side walls the refracting surfaces.

14,722.—Gas Cooking-Stoves: *T. C. Wilson.*—The novelty lies in the adoption of a stove top having a chamber over which is placed a detachable boiler, having a jacket which forms a hot chamber around its four sides, and provided with an outlet pipe, the underside of the top has a rim and dividing plates or ribs to conduct the heated air and waste products of combustion to the chamber; a flue pipe connected to a cavity over the oven and the chamber's underside; and the fitting of the burners centrally across the bottom of the oven instead of around its sides.

15,510.—Preparation of Sand or the Like for Use in Making Moulds or Cores: *T. Robinson.*—The inventor uses sawdust or similar powdered woody substance, mixed with water having clay suspended therein, or with clay moistened with water, so that the particles of sawdust become impregnated or coated with clay; the sawdust is partially dried in an oven and then mixed with the sand or loam to be used for moulds. He claims to overcome the difficulty of re-using sand for facing the moulds in consequence of the heat of the first casting destroying the sand's adhesive property and to dispense, in a great measure, with the use of powdered coal commonly used for facing sand.

15,959.—Pipe Couplings: *V. A. Jensen.*—For coupling small pipes is employed a nut composed of two parts which interlock, and having at one end an inwardly-directed flange or rim, the pipes have at one end a cylindrical screw-threaded head and a rim or collar, respectively, and the coupling is effected by screwing the nut into position.

16,090.—Acetylene Gas Generators: *H. Dant.*—The object of this invention is to ensure that the contents of each cell containing the calcium carbide shall in succession be converted into gas and be again re-charged without disorganising the operation of the apparatus. A reservoir is fastened to the bottom of a cistern and is closed at the top by a cap, its lower part having holes that admit water; in the cap are air-tight cylinders which contain the calcium carbide vessels. The cylinders have cocks serving for water inlet and gas outlet, and each differs from the others in that it is at a different height above the water level, so that one cylinder comes into operation when the other lower lying one has been flooded and has finished its operation.

Open to opposition until October 31.

[1898] 16,241.—Self-closing Door Hinge: *J. Wagner.*—An internally screwed projecting bush or bracket is secured to the wall or door frame; the hinge screw has a right and a left hand thread, with a collar lying between the oppositely screwed ends, and the hinge plate or bar carries an internally screwed bush. The hinge screw is so set in the bushes that when the door is closed the bushes and the collar are close together; when the door is opened in one direction the bush and the hinge plate rise with the door; when it is pulled in the opposite direction, the hinge screw, the bush, and the hinge plate rise with the door. Thus, in whichever direction the closed door is moved it rises, and its own weight effects the closing of the door.

New Applications.

September 12—17.

19,336, W. Simon, Acetylene Gas Lamps. 19,337, R. J. Rudd, Electrical Apparatus for Regulating Clocks. 19,345, F. Warren, Chimney Cowls, &c. 19,350, Montag and Others, Steam and Water Turbines. 19,356, W. North, Saw Guard. 19,357, C. Paterson, Blind Roller Mountings. 19,367, Goddard and Others, a Saw, specially applicable for use where there is a continuous feed. 19,368, G. Whittaker, Water Boilers. 19,369, J. Boss, 19,540, A. Browett, 19,674, J. V. Robinson, and 19,683, T. R. Waite, Generation of Acetylene Gas. 19,374, Edwards & Frazer, Apparatus for the Storage of Acetylene Gas. 19,381, M. Walker, Electrical Traction. 19,383, A. Furno, Alloy for Soldering Aluminium. 19,385, L. C. Boyle, Burners for Burning Hydrocarbons. 19,399, P. Mersch, Arc Lamps. 19,400, F. Ross, Measuring and Cost Indicating Apparatus. 19,403, F. Liegler, Mathematical Drawing Instrument. 19,410, R. W. Little, Cutting or Planing Devices for Curved or Irregular Surfaces of Wood, &c. 19,418, Oprendek and Others, Telephonical Installations. 19,420, J. Riley, and 19,501, J. Riley, Lock Mechanism. 19,422,

P Weber, Grade Delineators. 19,425, J. Carson, Reciprocating Pumps. 19,429, J. H. Barratt, Tile Decoration by Jets of Compressed Air. 19,432, Cookes, Safety Attachment for Elevators. 19,434, G. L. Scott, Friction Clutch. 19,436, C. C. Hartung, and 19,437, E. Walsh, Jun., Rolling Wired Glass. 19,443, H. Markham, and 19,600, Taylers, Circular Saw Guards or Shields. 19,457, A. J. Loftus, Count Nehtate, Cement for Securing Wall Facing Tiles and for Similar Purposes. 19,459, A. Pyke, Dust Bins. 19,465, V. Kjeldsen, Kiln for Calcining Cement Materials. 19,468, Mary J. Stone, Door Handles. 19,479, W. Lange, Water Plugs. 19,480, J. D. F. Andrews, Electrical Current Regulator. 19,483, J. Wild, Compasses. 19,493, H. O. Nienstaedt, Screw Taps. 19,500, T. McEwan, Electrical Fuses. 19,503, C. Smith, Drawing Compasses. 19,506, W. Bradley, High-pressure Water Taps. 19,508, H. Mechan, Manhole Covers. 19,512, T. H. Leathart, Red Lead, and other Oxides of Lead. 19,526, F. E. Walker, Gas Brackets. 19,528, R. Brunk, Manufacture of Bricks, Tiles, &c., from the Refuse of Alkali Works. 19,537, J. Burke, Dynamo-Electrical Machines. 19,550, A. R. McLellan, Disintegrators or Pulverisers. 19,559, H. Herberz, Drying Systems. 19,563, W. Seltner, Ball-bearing for Horizontally-moved Planes. 19,568, G. Isler, Parquetry Blocks and Strips. 19,577, J. Güthlein, Scaffolding. 19,582, A. E. Smedley. Grinding or Pulverising Machines. 19,585, R. White, Shakel Trap and Gulley Combined. 19,592, H. Appel, Soot Traps for Chimney Flues. 19,599, W. Thomson, and 19,618, J. W. Haglund, Locks. 19,602, Gillies and Others, Buttons and Nails for Wood and Upholstery Work. 19,607, H. Kerrill, Water-closet and other Cisterns for Ventilating the Apartments, and Apparatus connected therewith. 19,608, J. Scott, Combined Circular Saw Guard and Riving Knife. 19,610, Jones & Eaton-Shaw, Multiple Tool Holder. 19,621, C. W. S. Crawley, Coin-freed Electrical Meters. 19,623, W. Funnell, Heating, Ventilating, and Draught-excluding Apparatus. 19,633, G. Collantier, Decorating Material for Building Purposes. 19,637, W. Thomas, Syphoning or Flushing Apparatus for Lavatory Wash-basins. 19,638, E. Zorn, a Bed-plate for Preventing Vibrations or Noise, and for Protection against Damp. 19,650, A. Comley, Lifting Screw-jack. 19,668, A. C. Thomson, Damping Apparatus. 19,671, T. P. Richards, Drying Closets. 19,676, P. Barraclough, Stoves. 19,684, James and Others, Non-conducting Fireproof Composition for Buildings, &c. 19,695, O. Hurschmann, Spirit or Similar Fluid Fuel Stoves. 19,699, Tourtel and Others, Coin-freed Prepayment Meters. 19,706, Cort & Langwith, Coin-controlled Valve Mechanism for Gas Meters, &c. 19,721, Planet Foundry Co., and Others, Moulding-boxes. 19,734, Morris & Brown, Safety Appliance for Lifts, Cages, &c. 19,738, S. Timings, Sliding Bolts for Window Blinds, Doors, Cupboards, &c. 19,749, R. Thomson, Columns and Beams for structural purposes. 19,757, A. Landsberger, Purifying Acetylene Gas. 19,759, J. J. Williams, Tool or Apparatus for Removing the Margin or Edges from Wall Papers, &c., 19,766, F. Boas, Fireproofing Composition. 19,775, R. G. Howson, Lavatories, Sinks, Baths, Washtubs, &c. 19,780, Ballard & Woodhouse, Windows. 19,782, L. Maiche, Apparatus for Sterilising Water. 19,786, Bilbie & Drivet, Carbide of Calcium.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 13.—By A. T. & E. A. CROW (at Sunderland).

West Boldon, Durham.—Boldon West House Farm, 111 a., f. and c. £2,828
A freehold and copyhold brickfield, 5a. 2r. 38 p. 350
A way-leave rent of 30*l.* per annum 650

September 15.—By W. DEW & SON (at Llangefni).

Tregain, Anglesey.—The Erddrainiog Estate. 1,676 a. 3 r. 11 p., f. 33,000

Llanbadrig, Anglesey.—Four building sites with 2 cottages, 2 a. 2 r. 11 p., f. 335
A freehold cottage and 4 a. 1 r. 17 p. 225
A freehold holding, area 15 a. or. 25 p. 715
A freehold house and 1a. 100

By CASTLE, SON, & BOOTH (at Banbury).

Warmington, Warwick.—A farm-house and 114 a. 0 r. 19 p., together with a house and shop, f. 2,850

By H. H. BLETSOE (at Raunds).

Raunds, Northants.—The Raunds Grange Estate, 417 a. 1 r. 0 p., f. and c. 5,500
Berrysters Field and Thongs, 25 a. 2 r. 32 p., f. 1,200
Beebys Field with residence, 8 a. 2 r. 36 p., f. .. 650
Pepp's Close, 8a. or. 23 p., f. and c. 330
Round Meadow and meadow adjoining, 39 a. 3 r. 37 p., f. and c. 1,240
Cotton's Meadow, 10 a. 2 r. 10 p., f. 300

September 16.—By G. B. HILLIARD & SON (at Chelmsford).

Danbury, Essex.—A freehold messuage; also stabling premises, &c., adjoining 405

By A. J. SHEFFIELD.

Poplar.—20, 2A, 4, and 6, Athol-st., f., r. 114*l.* 8s... 1,250
Wapping.—28, Red Lion-st., u.t. 950 yrs., g.r. nil, r. 30*l.* 385

September 17.—By EDWARD BONO (at Aylesbury).

Great Kimble, Bucks.—The Poplars Farm and a farm adjoining, 238 a. or. 35 p., f. 5,200

September 19.—By CUMBERLAND & SONS (at Luton).

Toddington, Beds.—"The Griffin Inn," f., r. 50*l.* 2,225
The Herne Farm, 244 a. 1 r. 8 p., f. 3,550
Westoning, Beds.—Wood End Field and the Tingrith Moors, 24 a. 2 r. 26 p., f. 430
Long Close and Reddings, 14 a. 2 r. 7 p., f. 340
Luton, Beds.—Hart Hill, Fairlight, f., r. 55*l.* 1,250
111 and 113, Boyle-st., f., r. 26*l.* 350
Leagrave, Beds.—Laurel Cottage, f., e.r. 25*l.* 430

September 20.—By MAPLE & CO.

Kentish Town.—1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19, and 20, Gordon House-rd., u.t. 85 yrs., g.r. 40*l.*, r. 629*l.* (in lots) 8,540

By F. JOLLY & CO.

West Ham.—109 to 143 (odd), St. Mary's-rd., u.t. 67 yrs., g.r. 24*l.* 945
Stoke Newington.—153, Evering-rd., u.t. 76 yrs., g.r., 8*l.* 10s., r. 50*l.* 550
Streatham.—88, Mitcham-lane, u.t. 81 yrs, g.r. 10*l.* 10s. 600
Clapton.—Goulton-rd., f.g.r. 8*l.*, reversion in 64 yrs. 270
Leyton.—32, Grange Park-rd., and plot of land adjoining, f. 805
Chertsey, Surrey.—Guildford-st., &c., two plots of building land, f. 500

By E. SIMPSON.

New Cross.—11, Pepys-rd., u.t. 59 yrs., g.r. 10*l.*, e.r. 55*l.* £500
Peckham.—244, Queen's-rd., u.t. 62 yrs., g.r. 10*l.*, e.r. 55*l.* 525
Walworth.—44, 46, and 88, Mann-st., u.t. 54 yrs., g.r. 14*l.* 900

By WYER, ADAMS, & GLOVER (at Mason' Hall Tavern).

Clerkenwell.—Clerkenwell-rd., "The Sessions House Hotel," u.t. 60 yrs., r. 200*l.*, with goodwill; also l.g.r. 5*l.*, u.t. 60 yrs. 21,000

By DUNN, SOMAN, & COVRRDALE (at Ipswich).

Great and Little Wenham, Suffolk.—Wenham Lodge Farm, 122 a. 2 r. 26 p., f. 2,110
Arnold Field, 21 a 2 r. 31 p., f. 270

By Messrs. Spelman (at Great Yarmouth).

Gorleston, Suffolk.—Clarence-rd., Clarence Cottage, f. 540
Clarence-rd., four building sites, f. 710
Garnham-rd., a building site with 3 cottages, f. 320
Church-rd., two building sites, f. 810
Church-rd., a bungalow cottage, f. 210
Burnt-lane, four cottages and a plot of land, f... 140
Burgh-rd., enclosures of garden land, 3 a. 2 r. 3 p., f. 300
Burgh-rd., two enclosures of marsh land, 3 a. 3 r. 17 p., f. 165
Halfrey's-lane, four enclosures of marsh land, 12 a. or. 2 p., f. 635

September 21.—By CHANCELLOR & SONS.

Old Kent-rd.—Nos. 614 and 616, u.t. 13 yrs., g.r. nil, r. 45*l.* 310

By JENKINS & SONS.

Brockley—1, Upper Harefield-rd., u.t. 75 yrs., g.r. 8*l.* 10s., r. 48*l.* 415
New Cross.—411, New Cross-rd., f., r. 55*l.* 1,275

By E. W. RICHARDSON & SON.

Finchley.—Ballard's-lane, Argyle Villa and Stanley Villa, u.t. 80 yrs., g.r. 12*l.* 12s., r. 58*l.* 520
Dalston.—119, Forest-rd., u.t. 53 yrs., g.r. 6*l.* 12s., r. 38*l.* 365

By H. E. FOSTER & CRANFIELD.

City of London.—6, Cow Cross-st., f., r. 188*l.* 3,000
Haggerston.—41, Whiston-st., f., e.r. 42*l.* 395

By DOUGLAS YOUNG & CO.

Clapham.—37, Larkhall Rise, u.t. 64 yrs., g.r. 12*l.* 10s., r. 55*l.* 450
21, Albert-sq., u.t. 47 yrs., g.r. 5*l.*, e.r. 55*l.* 470
Forest Gate.—19, 21, and 24, Shrewsbury-rd., u.t. 93½ yrs., g.r. 16*l.* 10s., r. 102*l.* 760
Brighton, Sussex.—West Drive, a freehold building site 210
East Drive, two freehold building sites 1,360

By DAVIDSON & GARDEN (at Stonehaven).

Fordoun, Kincardineshire.—The Estate of Glenfarquhar, 5,000 a. 40,000

September 22.—By A. R. PEACEY.

Ealing.—The Park, the Park Nursery, and cottage adjoining, u.t. 28½ yrs., g.r. 10*l.*, r. 53*l.* 8s. 330

By H. J. BLISS & SONS.

Aldgate,—Black Horse-yard, warehouse premises, area 3,980 ft., u.t. 35 yrs., g.r. 50*l.*, r. 200*l.* .. 1,750
Barnes.—24 and 25, Beverley-rd., u.t. 67 yrs., g.r. 11*l.* 2s., r. 110*l.* 800
Bethnal Green.—20 to 30 (even), Clarkson-st., u.t. 38 yrs., g.r. 24*l.* 1,320
1, 3, 5, and 7, Middleton-st., u.t. 38 yrs., g.r. 16*l.* 890
39 to 47 (odd), Weaver-st., f., r. 156*l.* 1,980
Stratford.—207, High-st., u.t. 55 yrs., g.r. 6*l.* 200

By C. C. & T. MOORE.

Mile End.—3, St. Helen's-ter., u.t. 48¾ yrs., g.r. 7*l.*, e.r. 55*l.* 610
26 and 28, Dunk-st., f., r. 117*l.* 1,505
Stratford.—13, 14, 20, 21, 22, and 23, Warton-rd., u.t. 59 yrs., g.r. 24*l.* 835

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	0/0/0
Teak, E.I....load	10/10/0	15/10/0
Sequoia, U.S.ft.cu.	1/9/0	2/0/0
Ash, Canada, load	4/5/0	5/10/0
Birch, do.	4/0 0	5/15/0
Elm, do.	5/0/0	6/0/0
Fir, Dantsic, &c..	2/10/0	4/10/0
Oak, do.	2/0/0	4/0/0
Canada	4/0/0	6/0/0
Pine, Canada red	0/0/0	0/0/0
Do. yellow	4/5/0	6/5/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	8/10/0
Wainscot, Riga, &c., log.	4/5/0	6/5/0
Odessa, crown....	4/5/0	6/5/0
Deals, Finland 2nd & 1st std 100	9/10/0	10/0/0
Do. 4th & 3rd ..	9/10/0	10/0/0
Do. Riga	8/0/0	9/0/0
St. Petersburg, 1st yellow	11/10/0	14/0/0
Do. 2nd yellow.	10/10/0	12/0/0
Do. white	9/10/0	11/10/0
Swedish	9/10/0	16/10/0
White Sea	10/10/0	17/15/0
Canada, Pine 1st	18/0/0	24/10/0
Do. do. 2nd	13/0/0	16/10/0
Do. do. 3rd, &c.	6/0/0	9/10/0
Do. Spruce, 1st	8/10/0	10/10/0
Do. do. 3rd and 2nd	7/0/0	8/10/0
New Brunswick	7/0/0	8/0/0
Battens all kinds	5/0/0	16/0/0
Flooring boards, sq., 1 in. prep. 1st.....	9/5	16/0
Do. 2nd	8/0	13/0
Other qualities—	6/3	7/0
Cedar, Cuba, ft.	/4	/4½
Honduras, &c.	/3¾	/4½
Mahogany, Cuba	/5¾	/7½
St. Domingo, cargo av.	/5	0/9/3
Mexican, do. do.	/3¾	/4
Tobasco, do. do.	/4	/6¾
Honduras, do.	/4	/6
Box, Turkey, ton	4/0/0	15/0/0
Rose, Rio	7/0/0	14/0/0
Bahia	6/0 0	12/0/0
Satin, St. Doming.	0/0/3	0/2/0

TIMBER *(continued)*.		
Satin, Porto Rico	0/0/9	0/2/0
Walnut, Italian ..	0/0/3	0/0/7
METALS.		
Iron—Pig, in Scotland .....ton	2/8/3	0/0/0
Bar, Welsh, in London	5/15/0	5/17/6
Do. do. at works in Wales	5/10/0	5/12/6
Do. Staffordshire, in London.....	6/5/0	7/10/0
COPPER—British cake and ingot	55/10/0	56/0/0
Best selected ..	56/0/0	56/10/0
Sheets, strong..	60/10/0	61/10/0
Chili bars	52/3/9	0/0/0
YELLOW M.L. lb.	5d.	5¼d.
LEAD—Pig Spanish ....ton	13/0/0	0/0/0
English com. bands	13/5/0	0/0/0
Sheet, English 6 lbs. per sq. ft. and upwards ..	14/5/0	0/0/0
Pipe.....	14/15/0	0/0/0
ZINC—English sheet.....ton	25/10/0	0/0/0
Vieille Montagne	26/10/0	0/0/0
Spelter	22/0/0	22/2/6
TIN—Straits	74/3/9	0/0/0
Australian.....	74/15/0	75/0/0
English Ingots..	76/15/0	77/15/0
Banca	0/0/0	0/0/0
Billiton	/0/0	2/0/0
OILS.		
Linseed .....ton	17/5 0	0/0/0
Cocoanut, Cochin	27/15/0	0/0/0
Do. Ceylon	22/0/0	0/0/0
Palm, Lagos	21/15/0	0/0/0
Rapeseed, English pale	22/10/0	23/0/0
Do. Brown	21/5/0	0/0/0
Cottonseed ref. ..	14/5/0	15/5/0
Oleine.....	23/10/0	24/10/0
Lubricating U.S.	0/5/3	0/7/6
Do. Black	0/5/0	0/6/6
TAR—Stockholm barrel	1/5/0	0/0/0
Archangel.....	0/12/6	0/0/0
Turpentine	21/0 0	2/5/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100 unless in some exceptional cases and for special reasons.]

ABERDARE.—For the erection of the Ivy Bush Hotel, Cwmaman, Aberdare. Messrs. Morgan & Elford, architects:—
Williams & Williams, Cwmaman £1,277 10

ASHTON-UNDER-LYNE.—For sewering Hill-street, &c. Mr. J. T. Earnshaw, C.E., Town Hall, Ashton-under-Lyne:—

R. C. Fish, Ashton-under-Lyne*	—	W. Neal	—
J. W. Brierley	—	Underwood	—

* Accepted as per schedule prices.

BARNSLEY.—Accepted for the construction of sewers, &c., for the Hoyland Urban District Council. Mr. W. Farrington, C.E., Town Hall, Hoyland, near Barnsley:—
Alex. Brunton & Son, Hull £1,292 19 11
[Engineer's estimate, £1,337 12s. 6d.]

BASSALLEG (Mon.).—For the erection of four pairs of cottages, for Mr. C. D. Phillips, "Gaer Fach," Newport (Mon.):—

Baglow	£2,103	Partridge	£1,995
J. Davies	2,095	A. S. Morgan & Co.	1,866
J. T. Morris	2,080	C. H. Reed	1,801
J. Moore	2,080	J. Chanler, Newport*	1,744
E. C. Jordan	2,065		

* Accepted.

CAMBRIDGE.—For erecting Professors' houses at Westminster College, Cambridge. Mr. Henry T. Hare, architect, 23, Hart-street, Bloomsbury-square, W.C. Quantities by Mr. G. Fleetwood, 3, Newcourt, Lincoln's Inn, W.C.:—

W. Sindall	£4,123	W. Bell & Son	£3,998
S. F. Halliday	4,050	W. Saint (accepted)	3,876

CORK.—For alterations to 88, Old George's-street. Mr. D. J. Buckley, architect, 21, Adelaide-street, Cork:—

J. H. O'Connell	£245	J. Buckley, Lancaster Quay, Cork (accepted)	£210
L. Duggan	232		

DOVER.—For the erection of "The Corner Cottage," St. Margaret's Bay, near Dover, for Mr. F. W. Speaight. Messrs. Worsfold & Hayward, architects, Dover. Quantities by Mr. C. F. Poland, 6, John-street, Bedford-row, W.C.:—

R. Webster	£1,975	T. T. Denne	£1,796
Austin & Lewis	1,896	G. H. Denne & Son	1,775
Hayward & Paramor	1,839	J. J. Wise, Deal*	1,683
H. Reffey	1,798		

* Accepted.

DOVER.—For the erection of a workshop, &c., Maxton, for the Town Council. Mr. H. E. Stilgoe, C.E., Town Hall, Dover. Quantities by the Borough Engineer:—

T. Parsons	£439 12 2	Austen & Lewis	£389 8 0
Geo. Munro	422 17 2	H. B. Ellis, Dover*	381 18 6

Engineer's estimate £375.
* Accepted.

EPPING (Essex).—For additions to isolation hospital, Theydon Garnon, for the Rural District Council. Mr. E. Egan, architect, Holmdale, Loughton. Quantities by Mr. J. E. Holden, 39, Lombard-street, E.C.:—

	Building.	Drainage.	Total.
T. W. Foster, Loughton	£2,000 0 0	£156 10 0	£2,156 10 0
E. West, Chelmsford ..	1,820 0 0	168 0 0	1,988 0 0
W. Radley, Chigwell ..	1,650 10 0	290 0 0	1,980 10 0
W. Lawrence, Waltham Abbey	1,747 0 0	163 10 0	1,910 10 0
W. J. Cuthbert, Loughton	1,759 10 0	148 5 0	1,907 15 0
T. Keen, Theydon	1,600 3 9	145 0 9	1,805 4 6
J. Davey & Son, South Ockenden*	1,679 0 0	116 0 0	1,795 0 0

* Accepted.

GLOUCESTER.—For the erection of horse-sheds, &c., at Cattle Market, for the Corporation. Mr. R. Read, Engineer, Guildhall, Gloucester. Quantities by Engineer:—

J. Gurney & Sons	£798 0 0	E. Clutterbuck, Gloucester (accepted)	£778 0 0
Freeman & Jones	795 16 10		

GODALMING.—For the erection of cemetery chapels and lodge, Enshirg-lane, for the Joint Burial Board. Messrs. Welman & Street, architects, Church-street, Godalming:—

F. Mitton	£3,312	Harris & Son	£2,925
Mitchell Bros.	3,079	G. Horn	2,819
I. Lee	3,029	Bunning & Son, Loughborough Park*	2,599
Kingerlee & Sons	2,997		

* Accepted.

GREENHITHE.—For the erection of forty-eight cottages on the Stone Town Estate, for the Greenhithe Brick and Land Co., Ltd. Messrs. Dear & Winder, architects, 9, Southampton-row, W.C.:—

E. Jones	£15,424	Whitelaw & Wright	£11,465
R. Walker	13,440	Dowell	11,376
W. E. McGeorge	13,318	Try	9,650
H. J. Stephens	13,000	Lane & Son	8,637

LLANELLY.—For the erection of a house at Crosshands, Llanelly. Messrs. J. Davies & Son, architects, Llanelly. Quantities by architects:—

D. Wilkins	£195 0 0	Griffith Mainwaring	£170 0 0
Lewis Davies	195 0 0	Evan Jones	166 10 0
D. D. Mainwaring ..	186 10 0	Daniel Jones, Gorsgoch, Llandebie*	160 0 0
Wm. Jenkins	172 0 0		

* Accepted.

LLANGENNECH (Wales).—For the erection of a villa residence. Messrs. Davies & Son, architects, Llanelly. Quantities by architects:—

D. Jenkins	£1,426 19 10	Lewis Brothers	£1,010 0 0
B. Howell & Son, Ltd.	1,336 4 5	D. Jones	990 0 0
John Evans	1,246 14 0	W. Thomas, Llangennech*	968 4 0

* Accepted.

LLANGENNECH.—For the erection of a house at Llangennech. Messrs. J. Davies & Son, architects, Llanelly. Quantities by architects:—

Lewis Brothers	£461 8 10	John Evans, Erw, Llanelly (accepted)	£347 0 0
Wm. Gregory	417 0 0		
Wm. Thomas	350 0 0	David Jones	324 0 0

LONDON.—For rebuilding No. 15, Devonshire-square, E.C., for Messrs. Clapham, Fitch & Co. Mr. Howard Chatfeild Clarke, architect, 63, Bishopsgate-street Within, E.C.:—

Hall, Beddall & Co.	£4,821	Patrick & Son	£4,648
Brown, Son, & Blomfield	4,788	J. Smith & Sons	4,497
C. P. Roberts	4,763	Ashby & Horner	4,479
E. Lawrance & Sons	4,711	Woodward & Co.*	4,400

* Accepted.

LONDON.—For the erection of warehouse at Gun and Shot Wharf, Tooley-street, for Mr. Graves. Messrs. Waterman & Lewis, architects:—

E. A. Roome	£15,217	Munday & Son	£13,908
Outwaite & Son	14,712	Ashby & Horner	13,871
Greenwood	14,280	Kirby & Gayford	13,421
Howell J. Williams	14,206		

LONDON.—For pulling down and rebuilding the "Green Dragon" public-house, Bermondsey-street, for Mr. De Groat. Messrs Elkington & Son, architects:—

Batley Son & Holmes	£5,107	W. H. Castle	£4,777
Smith & Sons	4 848	Howell J. Williams	4,700
F. & H. F. Higgs	4,823	Carmichael & Son	4,397

LONDON.—For alterations and additions at the "Vine Tavern" public-house, Broad-street, Ratcliff, E., for Messrs. Holt & Co. Mr. Fred. A. Ashton, architect, 177, Romford-road, Stratford, E.:—

T. & H. Cocks	£1,089	A. E. Symes	£1,040

LONDON.—For the erection and completion of two factories in Ward-road, Stratford, for Messrs. Morris Streimer & Co. Mr. John Pugh, architect:—

A. Reed & Son	£4,522	Sheffield Bros.	£3,769
C. P. Roberts	4,450	W. Gladding	3,695
Gregar & Son	4,168	G. Huckett	3 570

LONDON.—For alterations, &c., at Tottenham Court-road Police-station, for the Receiver for the Metropolitan Police District. Mr. J. Dixon Butler, architect. Quantities by Mr. W. H. Thurgood:—

Patman & Fotheringham	£14,910	Sydney Hart	£12,937
Chessum & Sons	14,562	Lawrance & Sons	12,515
Holloway Bros.	14,476	T. Parker	12,393
J. Groves & Sons	14,397	Lathey Bros.	12,300
W. H. Lascelles & Co.	14,342	Scrivener & Co.	11,442
Higgs & Hill	13,784		

MANCHESTER.—For the erection of accident and out-patients' department at the Ancoats Hospital. Mr. W. Cecil Hardisty, architect, Manchester. Quantities by Mr. Charles Jackson:—

W. Southern & Sons	£6,252 0	R. Neill & Sons	£5,996 0
F. & E. Haynes	6,166 10	Wilson & Toft*	5,990 0
R. Whitell	6,000 0		

* Accepted.

MERTHYR TYDFIL.—For rebuilding "Glove and Shears" inn, Merthyr. Mr. C. M. Davies, architect:—

E. Lumley	£943 0	W. Jones	£847 0
J. Jenkins, Merthyr Tydfil (accepted)	849 15	M. Warlow	898 10
		H. Evans	800 0

MONEYNEANY (Ireland).—For new church, for the Rev. P Grant. Mr. Toye, architect, Strand, Londonderry:—

R. Colhoun	£3,500 0 0	J. McNally, Cooks-town, Co. Tyrone*	£3,268 0 0
J. Deeny	3,297 14 4		

* Accepted.

PENRHIWCEIBER.—For the erection of the Osborne Hotel, Penrhiwceiber, for Mr. W. W. Matthews. Messrs. Morgan & Elford, architects:—

Watkin Williams, Pontypridd £2,680

PONTARDULAIS.—Accepted for the erection of a house and shop, Hendy. Messrs. Davies & Sons, architects, Llanelly:—

Geo. Hughes, Pontardulais £110

RUGBY.—Accepted for additions to schools, Long Lawford, for the Newbold-upon-Avon School Board. Mr. T. W. Willard, architect, Market-place, Rugby:—

C. H. Rainbow, Rugby £350

SOUTHAMPTON.—For the erection of a pair of houses in Landguard-road, Southampton, for Mr. W. H. Abbott. Messrs. Jurd & Sanders, architects, 23, Portland-street, Southampton:—

E. F. Barrow	£1,408	A. Warden*	£1,295
Hood & Rabbetts	1,363		

* Accepted subject to variations.

SLIGO.—Accepted for the erection of a residence at the workhouse hospital, for the Guardians of Sligo Union. Mr. W. F. Gilcriest, architect, Wine-street, Sligo:—

George Kerr, William-street, Sligo £1,195

TENBURY.—For building a retaining wall, Kyre Brook, for the Rural District Council. Mr. R. W. Jarvis, Surveyor, District Council Offices, Tenbury:—

Thos. Vale	£240	Wm. Howells, Worcester-road, Tenbury*	£167
H. Hewitt & Sons	189		

* Accepted.

TOTTENHAM.—For pulling down and rebuilding Markfield House, Markfield-road, Tottenham. Messrs. Crawter, architects, Cheshunt:—

Stewart	£1,156	Walter Lawrence, Waltham Abbey (accepted)	£937
Porter	1,000		
Hawley	952		

TROEDYRHIW (Wales).—For the erection of eight houses for Mr. E. Stephens. Mr. C. M. Davies, architect, 112, High-street, Merthyr Tydfil:—

Wm. Lloyd	£1,597 12	J. James	£1,376 0
M. Marlow	1,520 0	T. W. Davies	1,344 0
J. Jones	1,521 0	Jones & Jenkins, Aber-cynon, Pontypridd*	1,120 0
D. L. Jones	1,418 0		

* Accepted.

WAKEFIELD.—Accepted for the erection of Wesleyan Sunday School, &c, South Kirkby, for the Trustees. Mr. G. F. Pennington, architect, Carlton-street, Castleford:—

H. Gundill, South Gate, Pontefract £544

WOOLWICH.—For rebuilding Nos. 37, 39, 41, 43, and 45, Powis-street, Woolwich, for Messrs. Carter. Messrs. Church, Quick, & Whincop, architects, William-street, Woolwich:—

Brading	£4,703	Cheshire, Wallington*	£4,203
Holloway	4,394	Thomas & Edge	4,163
Goad	4,303	Chapman	4,159

* Accepted.

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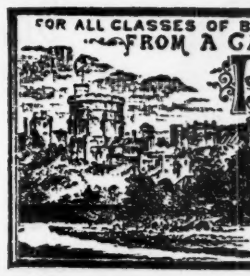

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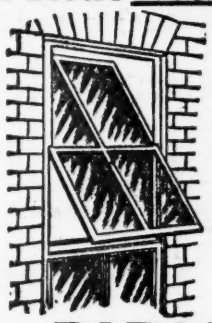

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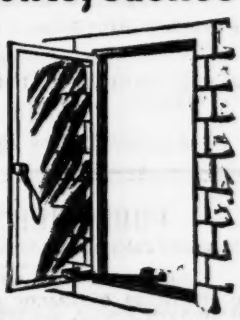

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7. Tewkesbury .. .. .. DEC.

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8. Fountains .. .. .. JAN.
9. Tynemouth .. .. .. FEB.
10. Malmesbury .. .. MARCH.
11. Netley .. .. .. APRIL.
12. Bolton .. .. .. MAY.
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16. Kirkstall .. .. .. JAN.
17. Abbey Dore .. .. APRIL.
18. Selby .. .. .. JULY.
19. Byland .. .. .. OCT.

1897.
20. Great Malvern .. .. JAN.
21. Sherborne .. .. APRIL.
22. Bayham .. .. .. JULY.
23. *Pershore .. .. .. OCT.

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1898.
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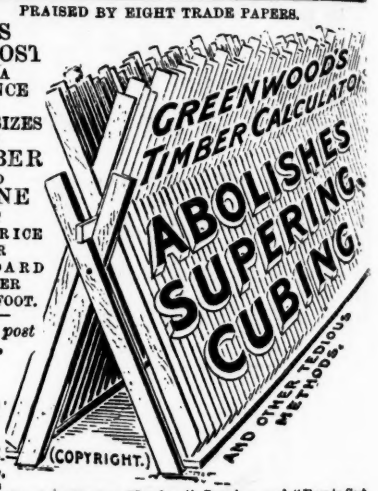

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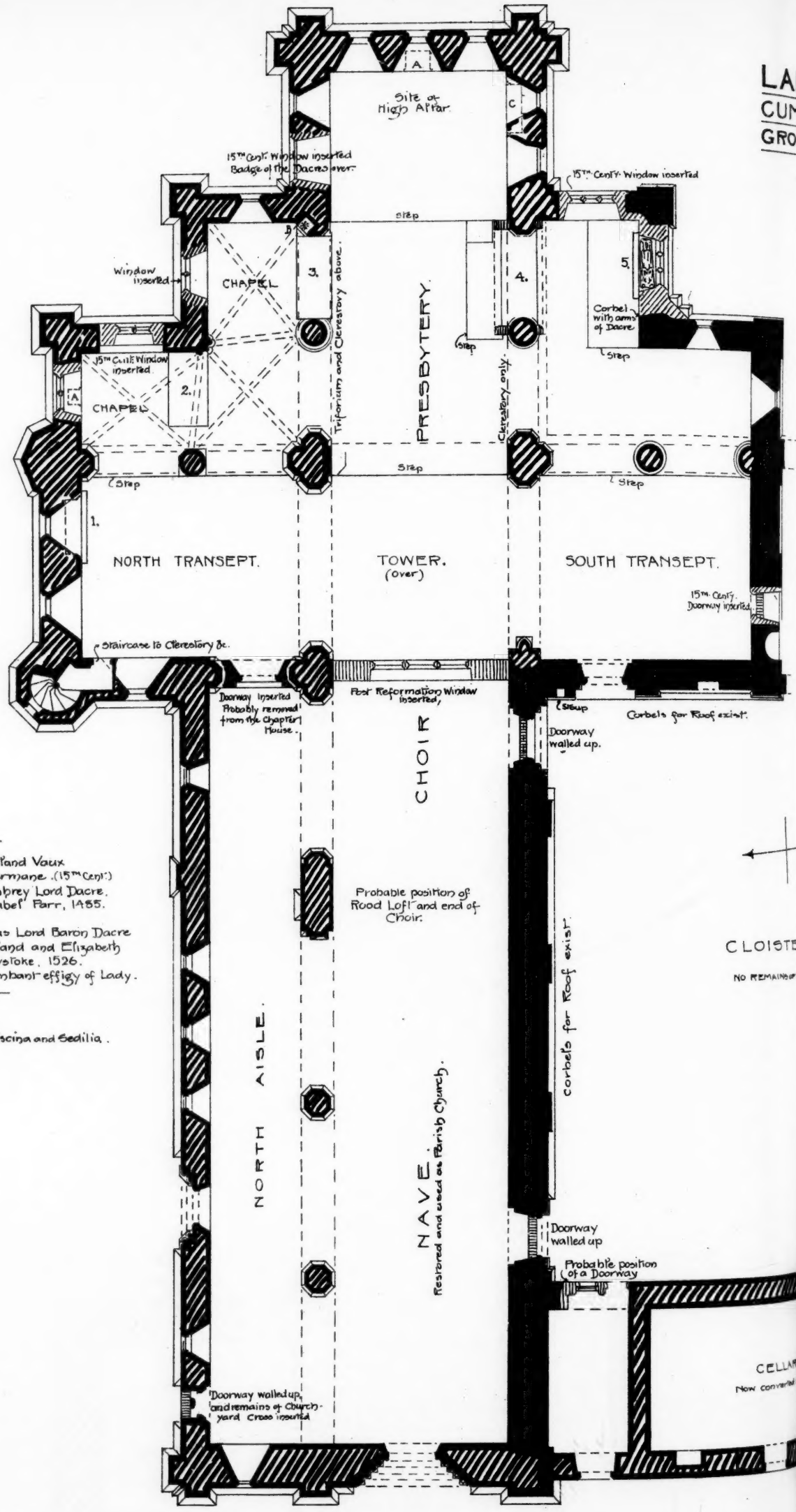
For details of Classes, Free Studentships, Prizes, and all further particulars, apply to the Director,
Professor SIMPSON, University College.

THE SANITARY INSTITUTE.—LECTURES and DEMONSTRATIONS for SANITARY OFFICERS.—The TWENTY-SIXTH COURSE of LECTURES will be held at the Parkes Museum, Margaret-street, W. on MONDAYS, WEDNESDAYS, and FRIDAYS, commencing OCTOBER 17th. The Course includes in addition to the Lectures a number of Practical Demonstrations and Inspections of Places illustrative of Sanitary Practice and Administration.—Full particulars can be obtained at the Offices of the Institute, Margaret-street, W.

SURVEYORS' INSTITUTION EXAMINATIONS.—Complete courses of preparation in class or by correspondence in all divisions and sub-divisions. At the last four examinations the following prizes were obtained by Mr. FARRY'S pupils:—1895 and 1896, Institution Prize, Driver Prize, and Penfold Silver Medal; 1897, Institution Prize and Special Prize; 1898, Institution Prize, Special Prize, Driver Prize, and Penfold Silver Medal, and Crawter Prize (one of the two bracketted winners of the last). At the Examination of last March MORE THAN HALF of the successful list were Mr. FARRY'S pupils.—Apply to Mr. RICHARD FARRY, F.S.I. A.M.I.C.E. &c. 27, Great George-street, Westminster (immediately opposite the Surveyors' Institution).

SANITARY INSTITUTE EXAMS.—Preparation for the Inspectors' Examination under a system of correspondence needing no Text Books or Acts, and for the Exam. in Practical Sanitary Science, by C. H. CLARKE, Assoc.San.Inst. Member of the Société Française d'Hygiène, 1st Honourman and Medallist in Hygiene, Member of the Society of Arts, Professional Lecturer on Sanitation. Clarke's methodical and reliable "Aids": —"Notes on Sanitary Law," 1s. 6d. "Sanitary Appliances" (diagrams), 1s. "Trade Nuisances, 6d. "Practical Drain Inspection," 6d. "Calculation of Cubic Space," 1s.—Prospectus from 130, Thorold-road, Ilford, E.

LANER
CUMBER
GROUND



CLOISTER GA

NO REMAINS OF THE AMBULATO

Probabl
and SP

REFERENCE.

1. Tomb of Sir Roland Vaux of Triermane. (15th Cent.)
2. Tomb of Humphrey Lord Dacre. and Mabel Parr, 1485.
3. Tomb ——
4. Tomb of Thomas Lord Baron Dacre of Gilsland and Elizabeth of Greystoke. 1526.
5. Tomb with recumbant effigy of Lady.

A.A. Aumbries.
B. Piscina
C. Remains of Piscina and Sedilia.

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

LANERCOST PRIORY
CUMBERLAND.
GROUND PLAN.

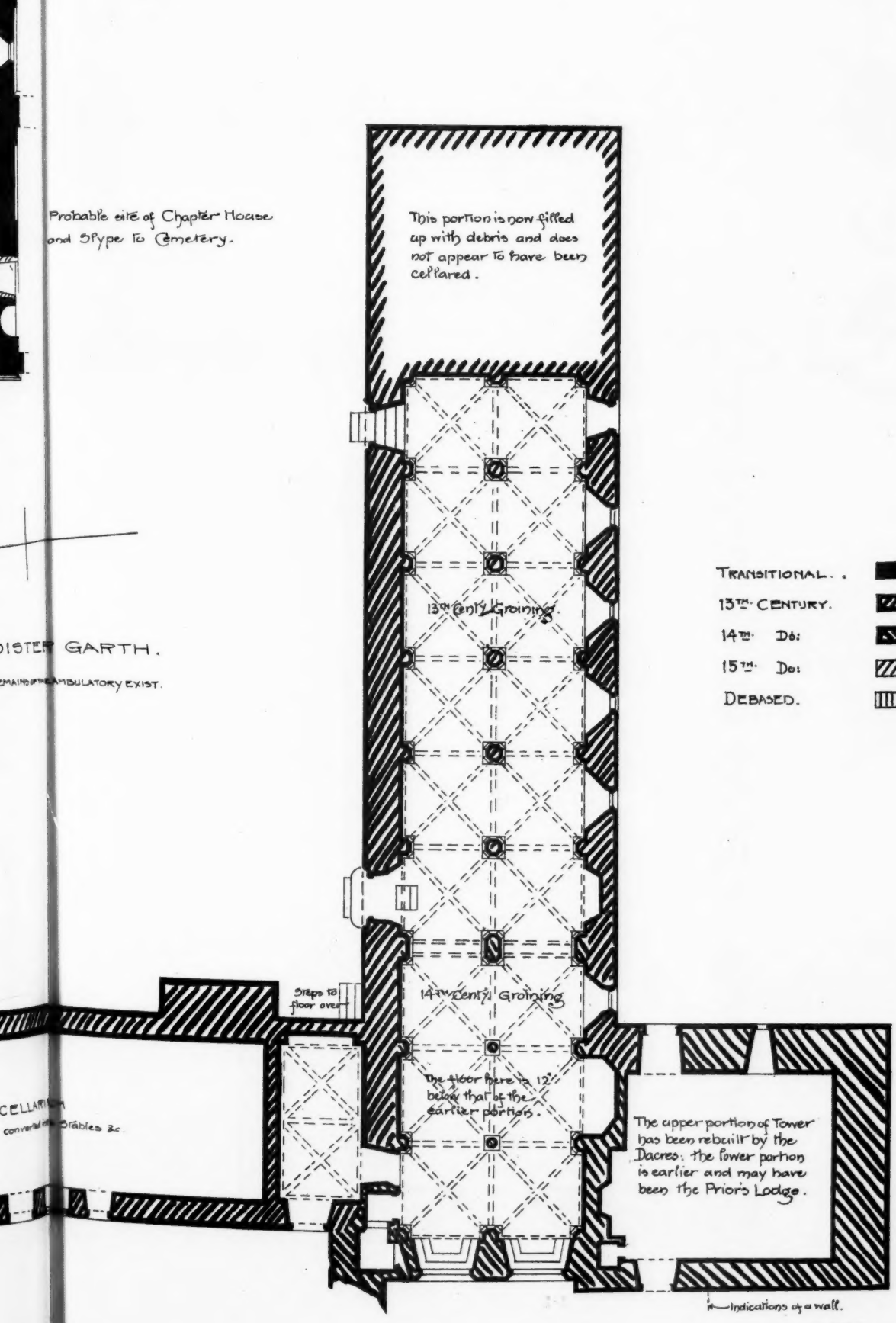
0 5' 0 10 20 30 40 50

Scale of feet.

DISTER GARTH.

EMAINS OF THE AMBULATORY EXIST.

CELLARER'S
converted into Stables &c.

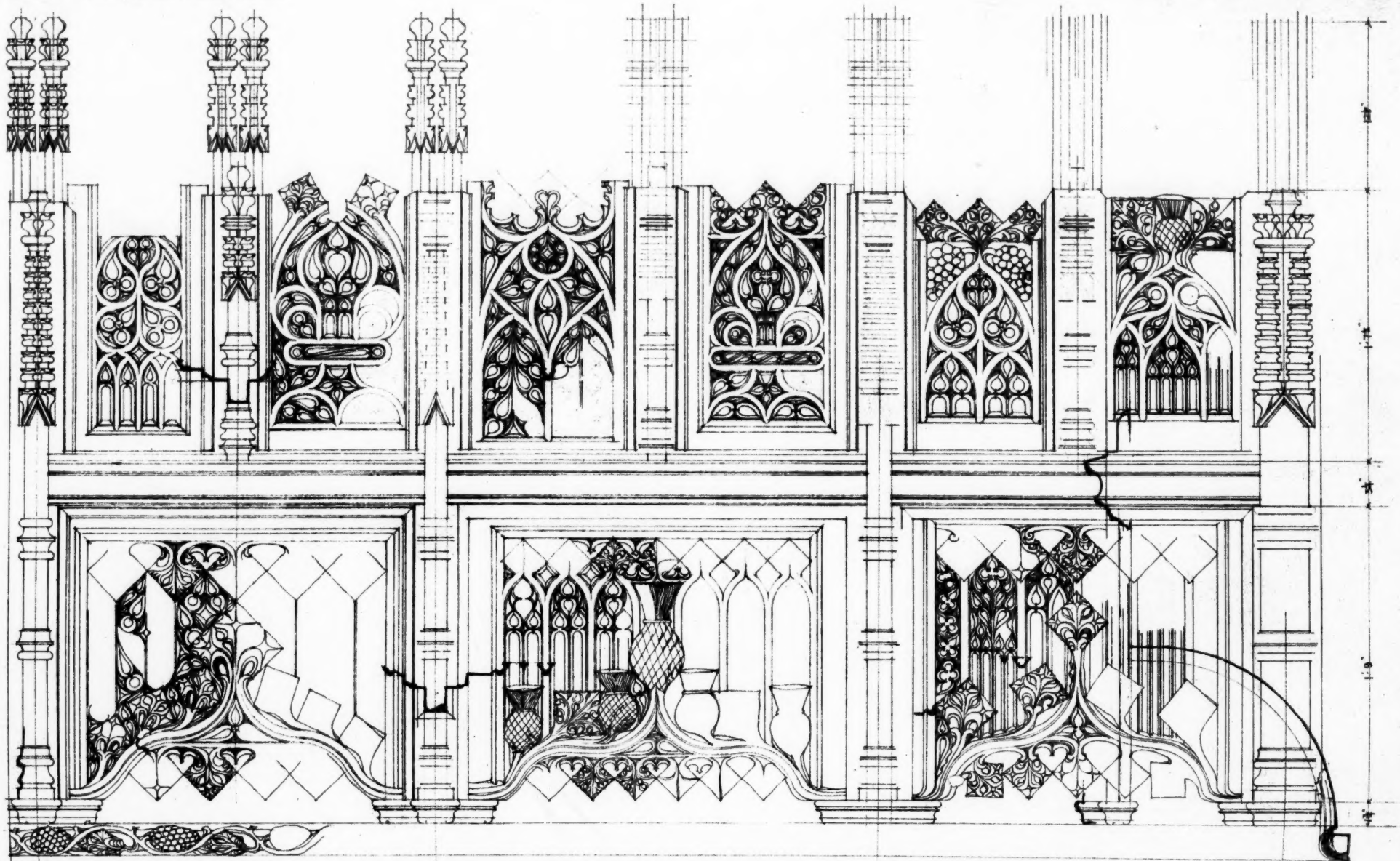

Probable site of Chapter House and Slype to Cemetery.
This portion is now filled up with debris and does not appear to have been cellared.
13th Cent'y Groining.
14th Cent'y Groining
Steps to floor over
The floor here is 12' below that of the earlier portion.
The upper portion of Tower has been rebuilt by the Dacres: the lower portion is earlier and may have been the Prior's Lodge.
Indications of a wall.

TRANSITIONAL. .
13TH CENTURY.
14TH Do:
15TH Do:
DEBASED.

E. Ridsdale Tate, Delt.
(Based upon plan by Mr. Charles J. Ferguson, F.S.A.)

STALLS IN CHAPEL: KINGS · COLLEGE OLD ABERDEEN

PART OF CANOPY AT RIGHT-HAND SIDE OF GATE.



REDUCED FROM DRAWN ON THE SPOT BY — John A. Gotch June 98

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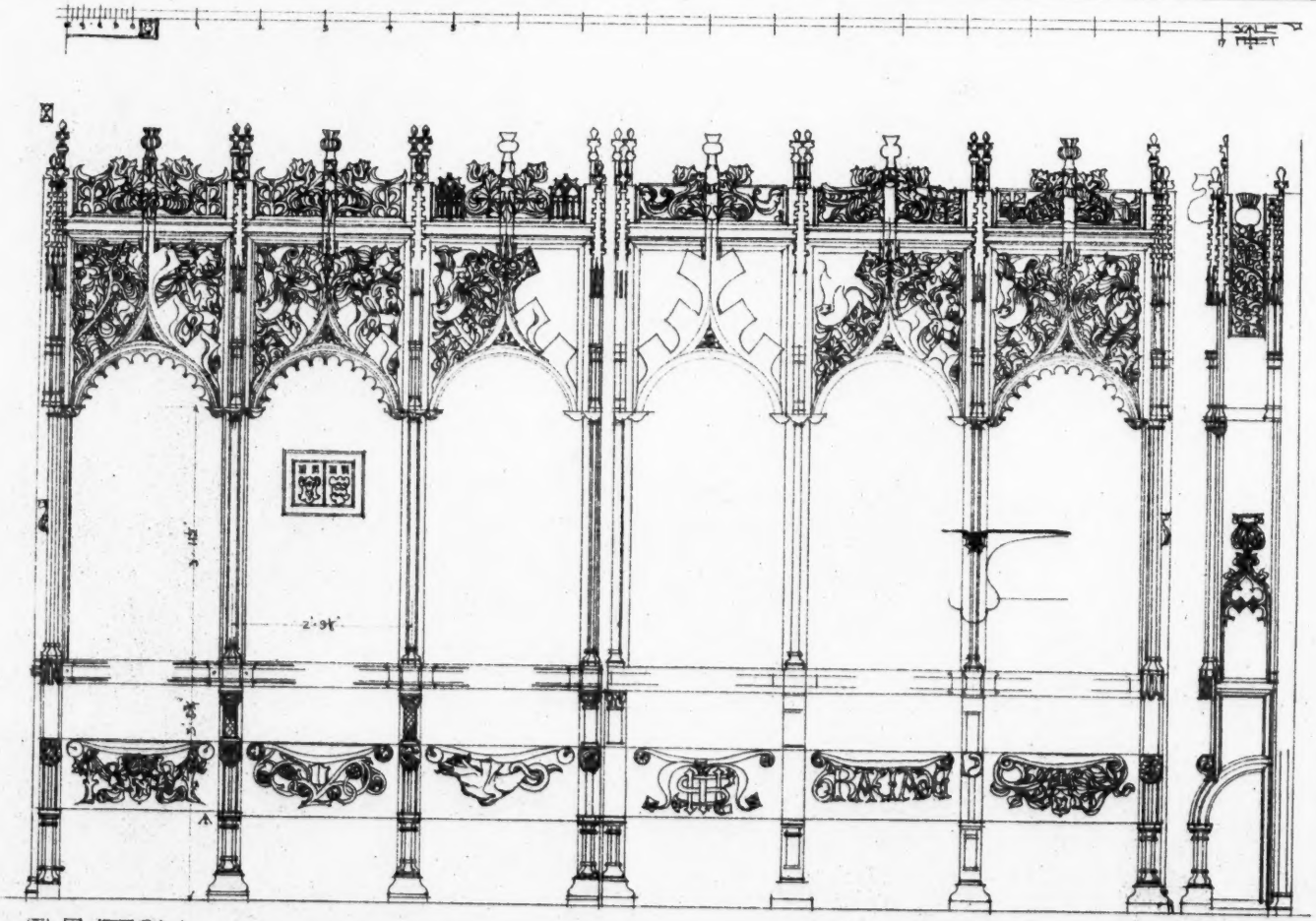
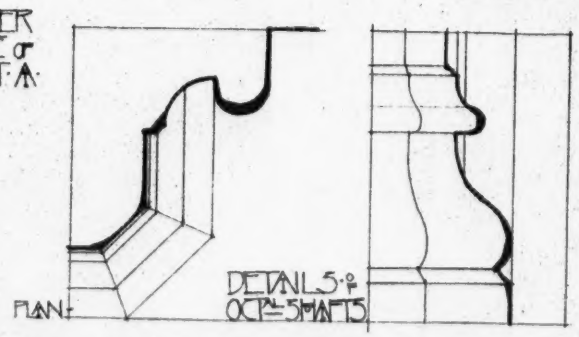
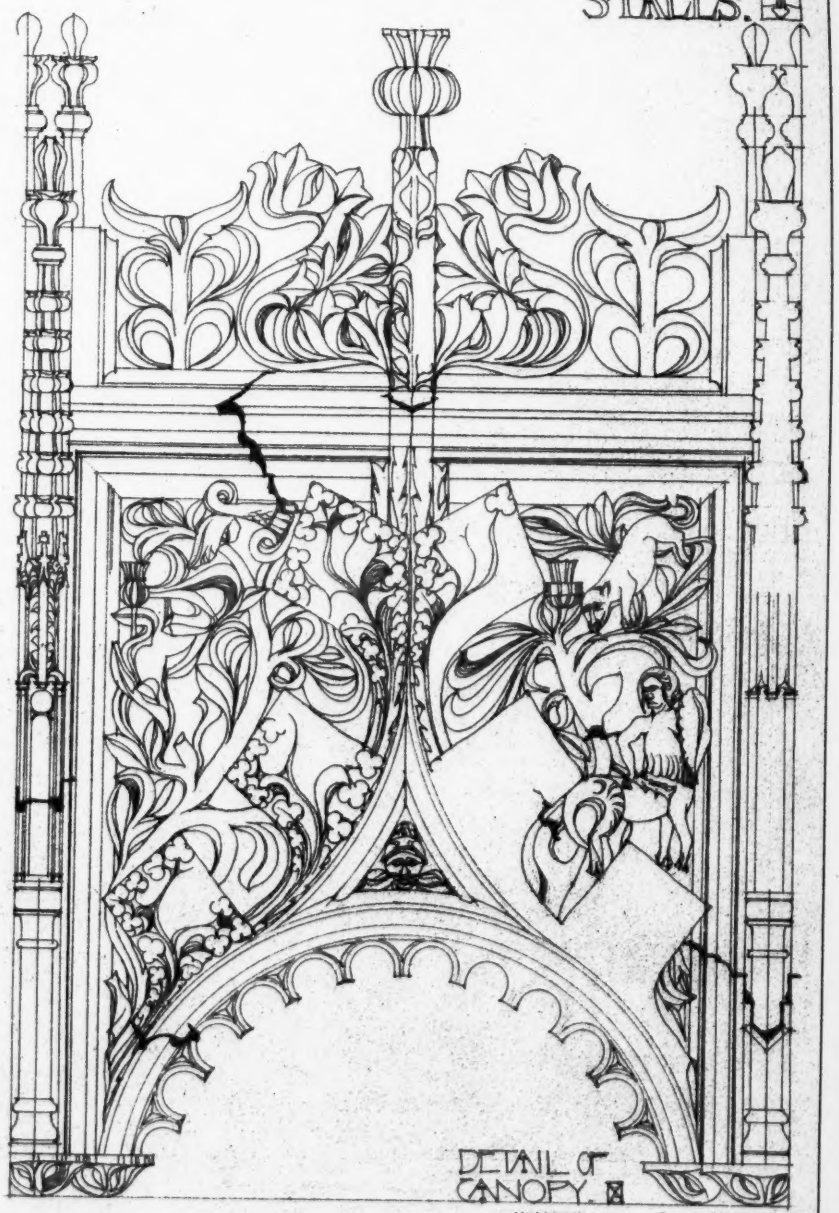
DUNBLANE · CATHEDRAL

1½" OLD OAK STALLS.







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Aldwinckle Studentship, R.I.B.A., 1898.

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10 OCT 1898

THE ABBEYS OF GREAT BRITAIN. N

Drawn by Mr. E. Ridsda

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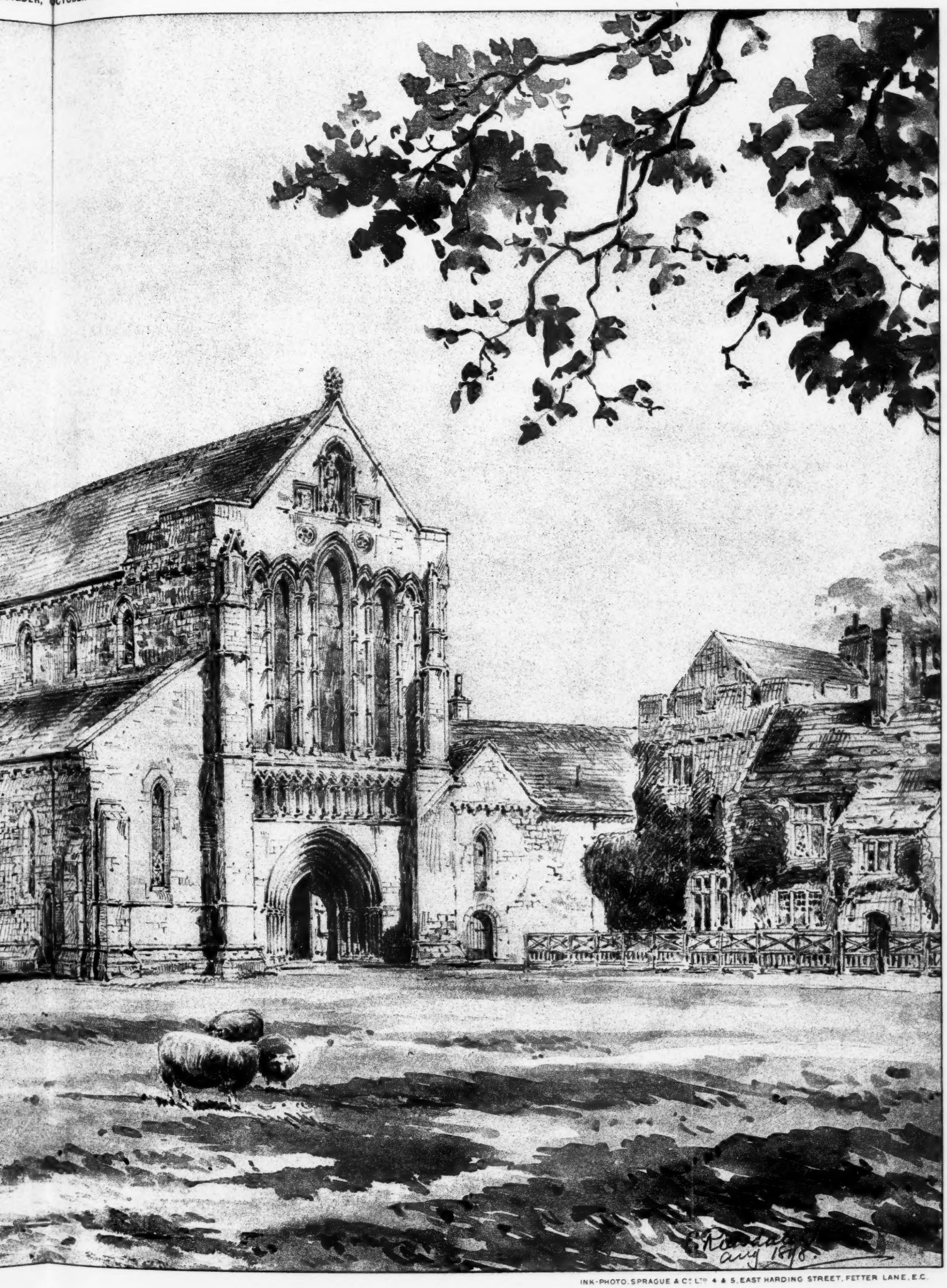
10 OCT 1898



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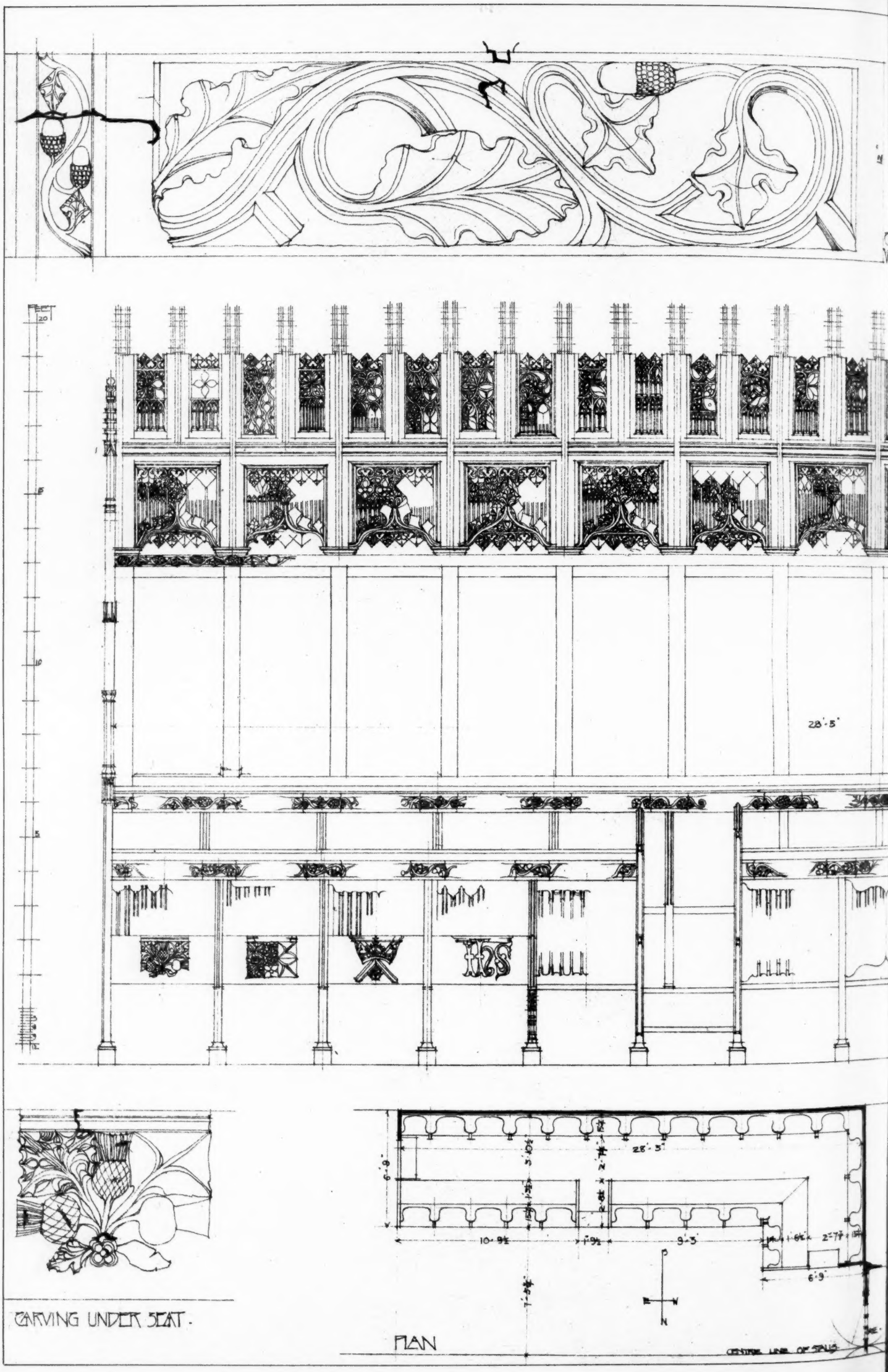
BRITAIN. No. 27. LANERCOST PRIORY.

BY MR. E. RIDSDALE TATE.



Aldwinckle Studentship, R.I.B.A., 1898.

STALLS IN CHAPEL KING'S COLLEGE OLD ABERDEEN

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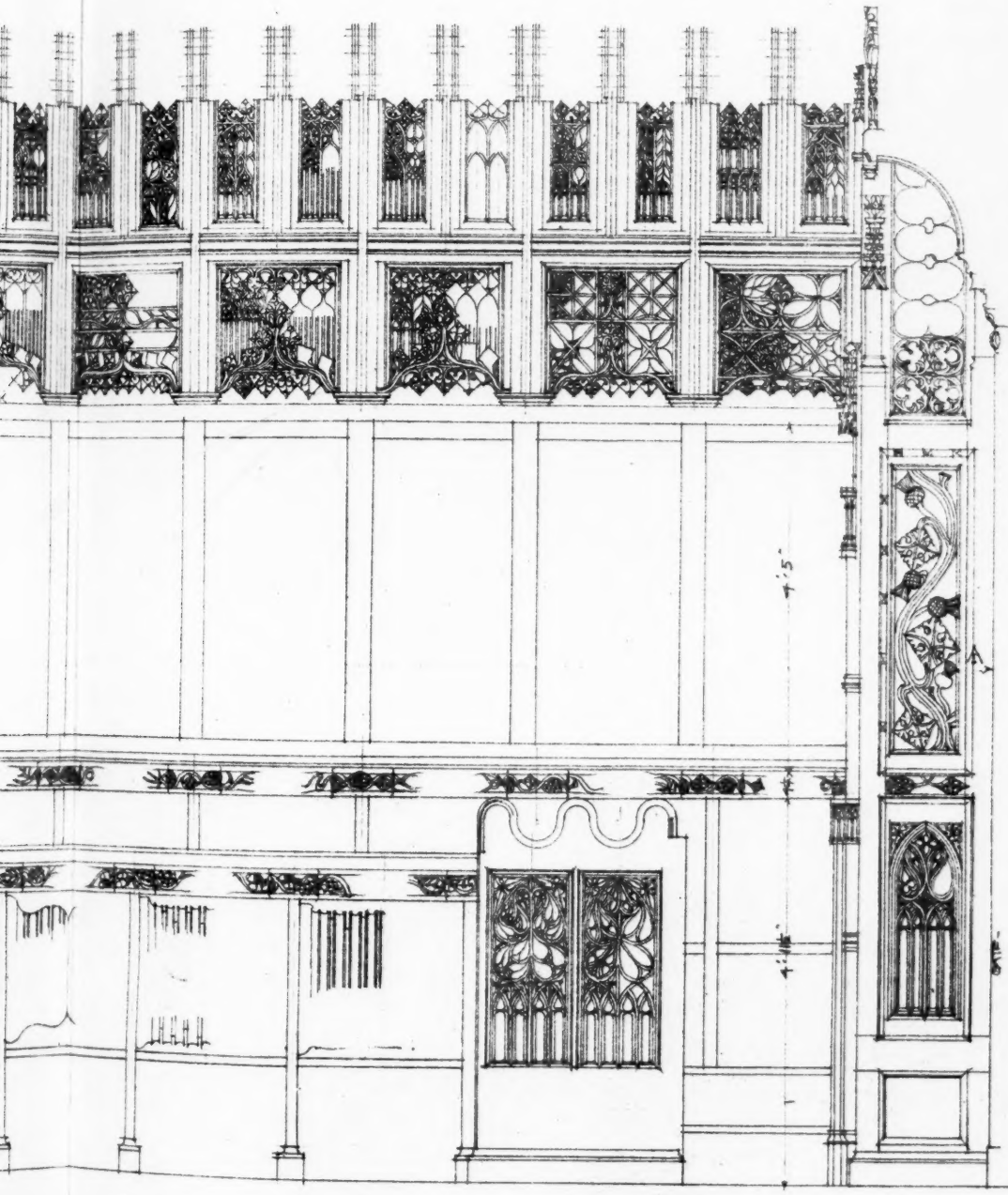
CARVING IN CANOPY PANEL X.

CARVING: WEST ELEVATION.



ELEVATION LOOKING SOUTH.

PANEL A.

MEASURED AND DRAWN ON THE SPOT BY:— Jas. B. Skelton. June 97.

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